FIELD MUSEUM OF NATURAL HISTORY BULLETIN

January 1984

FAMILY FEATURE: Make your own Chinese Shadow Puppets, Jan. 14 and 15

E HUMAN FACE OF CHINA—Film Series

Coming Feb. 5: Famous YUEH LUNG SHADOW THEATRE

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Field Museum of Natural History Bulletin

Published by
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CONTENTS

January 1984
Volume 55, Number 1

January Events at Field Museum 3

The 1992 Fair: Catalyst for Chicago's Future 5
by Willard L. Boyd, president of Field Museum

Shadow Theatre in the Land of the Dragon 8
by Jo Humphrey

Ceramics of the Song Dynasty 16
by Yutaka Mino

Why Are There So Many Kinds of Plants and Animals? 20
by William Burger, chairman, Department of Botany

Tours for Members 25

Our Environment 26

Index to Volume 54 (1983) 27

COVER

Procession of honor guard figurines. Polychrome pottery, Ming dynasty (1368-1644 A.D.). These and more than 200 other art objects and artifacts are on view through February 14 in the exhibition "Treasures from the Shanghai Museum—6,000 Years of Chinese Art."

Organized by the Shanghai Museum of the People's Republic of China, and the Asian Art Museum of San Francisco. Principally funded by Control Data Corp., Sargent & Lundy, and Consolidated Foods Corp.

Photo by Ron Testa. Cover design by Allen Ambrosini.

EVENTS

Winter Fun 1984

Drive away the winter doldrums! Treat your children (or grandchildren) to weekend workshops at Field Museum during January and February. Young people ages 4 to 14 can participate in classes that range from "Dinosaurs —the Terrible Lizards" and "Chocolate Chip Geology" to "Gorillas High and Low" and "Fossil Coal Forest of Illinois."

Special classes highlighting our current exhibit. "Treasures from the Shanghai Museum: 6,000 Years of Chinese Art," include "Spirits and Demons in Chinese Opera," "Chinese Dragon Robes," and "Crickets: Chinese Music Boxes."

Anthropologists, zoologists, archaeologists, paleontologists, botanists, artists, and writers bring their talent and expertise to create new, informative, and creative experiences. See the *Winter Fun* brochure for a complete schedule or call 322-8854, Monday-Friday, 9:00am-4:00pm.

Family Feature

Chinese Shadow Puppets

Saturday and Sunday,
January 14 and 15, 1:30pm
Hall 32, South, Second Floor

Shadow puppet figures have been used in popular Chinese theatre for over 2,000 years. Chinese Shadow Theatre was brought to America in the 1850s by the Chinese immigrants who helped build the railroads and work the gold fields. Discover this ancient folk art by watching a play designed to enhance children's understanding of our special exhibit, "Treasures from the Shanghai Museum: 6,000 years of Chinese Art." Children can make shadow figures from Chinese legends and join together to invent their own shadow play.

This program is supported by the National Endowment for the Humanities, a federal agency. Family Features are free with Museum admission and tickets are not required.

Plants of the World photo contest winners are on view in Hall 25, Second Floor.

The Human Face of China Film Series

These films explore the many faces of China—from acrobats in the Shensi Provincial Acrobatic Troupe to members of the People's Commune in Guangdong Province.

January 14 and 15, 1:30pm
One Hundred Entertainments
A behind-the-scenes look at the Shensi Provincial Acrobatic Troupe training, performing, and explaining their 2,000-year-old art form.

Mind, Body and Spirit
East and West, old and new come together in this exciting portrayal of China's health care system in action.

January 21 and 22, 1:30pm
It's Always So in the World
An intimate view of urban life in China's largest city, Shanghai, portrays communal society in China today.

Something for Everyone
A fascinating mosaic of a People's Commune in Guangdong Province, pieced together from the daily activities of the people who share in this lifestyle.

These films are free with Museum admission and tickets are not required. This program is supported by the National Endowment for the Humanities, a federal agency.

January Weekend Programs

Each Saturday and Sunday you are invited to explore the world of natural history at Field Museum. Free tours, demonstrations, and films related to ongoing exhibits at the Museum are designed for families and adults. Check the *Weekend Passport* upon arrival for the complete schedule and program locations. The programs are partially supported by a grant from the Illinois Arts Council.

January

7 11:30am ***Ancient Egypt.*** Investigate the traditions of ancient Egyptian civilization from everyday life to mummification and the promise of an afterlife.

8 12:30pm ***Museum Safari.*** Seek out shrunken heads from the Amazon, mummies from ancient Egypt, and big game from Africa.

14 1:00pm ***Red Land/Black Land.*** Focus on the geography of the Nile Valley and its effects upon the Egyptian people during 4,000 years of change in religion and culture. Examine the pharaoh's lifestyle and the religious practices of priests.

21 2:30pm ***Discoveries from the Bronze Age.*** Splendid bronzes and recent tomb discoveries illuminate the making of a great civilization in this slide lecture of Chinese treasures.

22 12:30pm ***Museum Safari.*** Seek out shrunken heads from the Amazon, mummies from ancient Egypt, and big game from Africa.

2:30pm ***China's Great Wall and the Silk Road.*** Slide lecture takes you on a journey, west along the Great Wall and the caravan roads. Travel back to China's ancient capitals and follow the course of empires, arts, and faiths.

29 12:30pm ***Journey Through China.*** Enjoy the scenic beauty and romance of today's China in this slide lecture which carries you from the modern cities of Shanghai and Suzhou to the ancient imperial capital, Xian.

2:30pm ***Arts and Inventions of China.*** Explore the cultural and technological achievements of classical China in a slide lecture of magnificent art forms and ingenious inventions.

These weekend programs are free with Museum admission and tickets are not required.

Coming Next Month

Yueh Lung Shadow Theatre

Sunday, February 5
1:00pm and 2:30pm
James Simpson Theatre

Shadow theatre is a performing art more than 2,000 years old. The Yueh Lung Shadow Theatre is the only one of its kind in the United States. The company uses Beijing-type figures constructed by troupe members. These are exact replicas of those collected in China by former Field Museum anthropologist Berthold Laufer in 1902 and 1904.

The performances feature Chinese shadow puppets manipulated by professionals and illuminated on a screen. The puppets recreate stories of Chinese life and legend. The puppet theatre was originally designed as a communication system to convey messages to remote Chinese villages. In many cases this was the only connection village people had with the outside world. By the mid 1930s this traditional Chinese art form had all but disappeared. During performances, the stories and the use of the puppets are explained.

Because the number of seats available for each performance is limited, advance purchase of tickets is recommended. These performances are partially funded by a grant from the National Endowment for the Humanities, a federal agency.

Members: $3.00
Nonmembers: $5.00

Use coupon below to order tickets.
Fees are nonrefundable.

Graphics by Allen Ambrosini

Registration

Please complete coupon for your program selection and any other special events. Complete all requested information on the application and include section number where appropriate. If your request is received less than one week before program, tickets will be held in your name at West Entrance box office until one-half hour before event. Please make checks payable to Field Museum. Tickets will be mailed on receipt of check. Refunds will be made only if program is sold out.

Program Title	Member Tickets #Requested	Nonmember Tickets #Requested	Total Tickets #Requested	Amount Enclosed
			Total:	

Name

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City State Zip

Telephone Daytime Evening

Have you enclosed your self-addressed stamped envelope?

For Office Use:

Date Received **Date Returned**

Return complete ticket application with a self-addressed stamped envelope to:

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Field Museum of Natural History
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Chicago, IL 60605-2497

The 1992 Fair: Catalyst for Chicago's Future

by Willard L. Boyd
President of Field Museum

The following text is from an address given by Dr. Boyd before the Chicago Central Area Committee at the 1992 Chicago World's Fair Seminar on November 3 at the University of Illinois at Chicago. The text of an earlier address by Boyd on the Fair, "1992 and Beyond," appeared in the March 1983 Bulletin *(pp. 6-7).*

As Mr. Ayers* has repeatedly pointed out, the 1992 Fair was conceived as a means to a greater end. That end is a more vigorous Chicago and Illinois; more vigorous economically, socially and culturally. Too many people are writing Chicago off as the declining capitol of America's frostbelt. Like the Columbian Exposition of 1893, the 1992 Fair is a response to a basic problem. The Columbian Exposition was the major stimulus in rebuilding Chicago after the 1871 fire into a city of national and international consequence. Nineteen-eighty-three again finds Chicago and Illinois facing a basic challenge. How can we retain and increase our role as a major world center? If that cannot be accomplished, the heyday of this city and this state is over.

Our vision of this Fair must not be limited only to the exposition itself. Our vision must also be concerned with the future of Chicago and Illinois. We must build a more vigorous and humane climate in which people can work and live and serve the entire world. A universal world's fair can be a crucial factor in developing that vigorous and humane climate.

The key to developing that climate is the process itself. As the discussion groups stressed in the April meeting [of the Chicago Central Area Seminar], the process before, during and after the Fair could be the greater end of which Tom Ayers speaks.

Equality of opportunity is the foremost goal of our times. American democracy is becoming more and more participatory. We take pride in our pluralism. As more diverse persons with more diverse points of view become effectively involved in our society, consensus will be more difficult to achieve. We must understand that challenge and argumentation will be the norm. We must accept the fact that there may be more than one right solution to any economic or social problem. Each of us must have the opportunity to present his or her case in an open and fair forum. Given that opportunity, we must be prepared to support a resulting decision even though it does not initially command a cohesive majority.

While we must, of necessity, fix Fair responsibility on a managing board of limited size, we must also have a participatory process which is open-minded, open-ended, open to all. In doing so, we must recognize that today's eccentric ideas are tomorrow's practical solutions. Too often, planning is a straight line projection of the present without regard for unforeseen and ever-changing circumstances. It is a conservative process which defends the present. Economic and social vitality require new ways and new ideas which involve risks. We must be venturesome even though we are captives of our own experiences.

As we look to the Fair and its residuals, we must be concerned with the development process. The Department of Commerce environmental scoping hearing and the ultimate impact statement are one means. The Mayor's Committee hearings have been another. As the city and state governments now move to the forefront of the planning process, the Fair Authority must be designed to encourage participation and at the same time recognize that there must be closure on issues after a reasonable period of time.

Much of the process discussion currently focuses on creating and financing the Fair. Of greater importance is the process needed to address the impact of the Fair and the site on nearby neighborhoods and the entire city and state.

The Fair offers the opportunity to create an

*Thomas G. Ayers is chairman of the Executive Committee of Commonwealth Edison Company and chairman of the Chicago World's Fair—1992 Authority.

urban planning process which reflects the needs of diverse citizens. In planning for diverse uses, new patterns can be developed so that urban planning mistakes are not repeated. More importantly, a planning and implementation process must be designed to assure that there are no losers. Development must not mean displacement. We have the opportunity to show that Chicago and Illinois can lead in the next century in humane concerns as well as commerce.

In recent years, Chicago's Center City Planning has focused on the north Loop and the near-north side. The Fair will focus attention on the south Loop and the near south and west communities. The residents of these areas reflect the many circumstances and aspirations of all Chicagoans. The apprehension of these neighborhood residents was reflected in the hearings before the Mayor's Committee. On the one hand, they are supportive of the Fair. On the other hand, they are concerned about what the consequences will be for them before, during, and after the Fair.

City government, the private sector, both profit and not-for-profit organizations, and neighborhood residents must now formulate a planning process so that the citizens of these neighborhoods will be beneficiaries, not victims, of the Fair. Diverse commercial and housing requirements must be met. In doing so, we can imaginatively pursue energy conservation, efficient transportation systems, and other urban needs. A planning process should emerge which could set a pattern for other neighborhoods to use in meeting other needs.

There must also be a planning process which looks to the use of the south lakefront site after the Fair. How can the site be designed to achieve the most significant permanent residuals. Only San Francisco and Rio de Janeiro can rival the beauty of our lakefront. But even they cannot rival Chicago in public access and public use of the waterfront. And yet since 1933, we have destroyed Daniel Burnham's* concept of a great south lakefront: (a) we have built an airport; (b) we have built an outer drive which chops up the park from Field Museum south to McCormick Place and further isolates the south lakefront from the Loop and the neighborhoods to the west; and (c) we have increased the use of Soldier Field and McCormick Place without regard for the impact on other lakefront uses.

The 1992 Fair gives us the opportunity to recreate Daniel Burnham's park. It can become a neighborhood park. To make it a neighborhood park, we must physically tie the south lakefront to the south and west neighborhoods. Our south lakefront can also be a park for the entire city, state, and indeed, the nation, in much the same way as Ontario Place on the Toronto waterfront has become the pride of all Canada.

The 1992 World's Fair affords us the opportunity to redesign the south lakefront, to make it into a pedestrian park, and to provide expansion space for existing and future cultural institutions and to give us a central gathering place for all Chicagoans. This area can become Chicago's front yard and the statewide gateway for increasing visitors and conventioneers. Residents and tourists alike will be able to bring their families for the day to the south lakefront as they now go to Lincoln and other parks. This site can be both a neighborhood and a national park unrivaled in beauty and public access.

And yet, there is no process now in place to accomplish these ends. To do so requires the joint planning of the Chicago Park District, the World's Fair Authority, the affected institutions, the nearby neighborhoods, and include the over-all city and state point of view. Coordinated planning can be undertaken which will assure mutually harmonious development for park district sports, McCormick Place, and the cultural institutions. We must develop pedestrian campuses for the cultural and sports areas, provide adequate parking, and assure the space for the Park District, McCormick Place, and the cultural institutions to develop in support of each other rather than to the detriment of each other as they are now developing.

A redesigned lakefront resulting from the Fair must also be oriented to the west as well as to the north and south. It must be integrated into the city. In addition to good public transportation to the Loop, there must be direct east/west access. Access from the west must encompass automobiles, public transportation, and pedestrian needs. Over time we must build community land bridges across the Illinois Central tracts.

An east/west access is vital to the success of the Fair. It is essential to the long-term future of the near south and west communities and the lakefront.

Too often we think of the lakefront on a north/south axis. If we look at it on an east/west axis, we see a major corridor of vital neighborhoods, and of educational, research, and cultural institutions. Starting in

*Daniel H. Burnham (1846-1912) was an architect and city planner and chief planner of the World's Columbian Exposition.

Grant Park with what has been described by historian Carl Condit as "the largest, oldest and architecturally most-impressive cultural center in the United States," we move to the south Loop where within four blocks of the Goldblatt Building there are 27,000 students enrolled in institutions of higher education, further west lies the University of Illinois at Chicago, beyond it the health center of the University of Illinois, Rush Presbyterian St. Luke's Medical Center and Cook County, on to Brookfield Zoo, the Naperville research route, and Fermi Laboratory. The areas involved are important and diverse neighborhoods with additional educational and cultural institutions. Our vision of the next century must include this east/west strength. Our vision will be limited by today's experiences and finances, yet our vision must allow for future generations.

The physical legacies of the 1992 Fair, while tangible, must be based on intangibles. These underlying intangibles should be those you espoused as the theme of the Fair: interdependence, the interrelatedness of people and nature, the recovery and rediscovery of our city and of our neighborhoods. How can these fundamental themes be exemplified in a Fair?

What is the "Age of Discovery?" To what extent are we going to celebrate the Columbian Quincentennial in 1992? Are we tied to Columbus and to the times between 1492 and now? To what extent is the Fair a means to our future?

In 1992, the state of Florida will commemorate "the discovery." Already they are involved in archeological digs at St. Augustine and in the Caribbean to ascertain the impact of Columbus's arrival and with it the Spanish influence in the New World. Ironically, the influence of the discovery of the New World commenced in 1492 but not until 1493 for the Old World when it learned of the discovery. We need also to remember that the first people to come to North America came across the Bering land bridge and were here to welcome Columbus. Will we examine how the 1492 discoverers treated the residents of this New World? Indiana University has organized a major center for the Columbian Quincentennial which will serve as a clearing house for observances throughout the country. That center suggests that the Columbian focus might well be on life in the New World between 1492 and 1776, since we have only recently marked the bicentennial of the United States and will soon do the same for the United States Constitution.

We should join with the Spanish to look forward to a new age of discovery. Our Fair must serve as a world marketplace of ideas and ideals for the twenty-first century. It must be more than a showcase for high tech and space exploration, more than a financial success. The Fair must deal with our lives as we live them in the neighborhoods of the world. Theme pavilions can complement national pavilions as they do now at Epcot. Yet, too often Epcot resorts to psychodelic lights to depict the future rather than thoughtfully; Kraft, on the other hand, addresses the future with its land pavilion and its experimental greenhouse. In 1992, we must get beyond the episodic nature of "Future Shock." The Fair itself can have a lasting impact on all who attend. As in the case of the earlier two fairs, it can educate and entertain for a lifetime.

The Fair can be a time for cerebration as well as celebration. During the next century, human initiative and human creativity must be fostered. The 1992 World's Fair needs to tap the talents and aspirations of people everywhere. This can be done simultaneously on the Fair site and in the neighborhoods of the world. It can be done in Fair buildings; it can be done in neighborhood halls; it can be done at home by television and computer and we can be linked across the planet by satellite.

Chicago, Illinois, and the Middle West are second to no place in the world of talent. For example, the greatest concentration of the nation's research universities is in the Middle West, not on Route 128 or in Silicon Valley. It is up to us to demonstrate that Chicago, Illinois, and the Middle West are an international center of human talent second to none. During 1992, a series of discovery seminars and congresses is being planned which will bring together the talent of the world under the auspices of Chicago and Illinois host institutions. We can rivet the attention of the world on Chicago as a place of creativity, as a place concerned with the future.

Only eight and one-half years remain before the Fair. We have much to do within that brief time. We have the opportunity to demonstrate to the world through the Fair, the discovery congresses and through the tangible and intangible residuals that we are still pioneers and that discovery is our never-ending frontier. □

Shadow Theatre
In the Land of the Dragon

by Jo Humphrey

Ho Hsien-ku, one of eight immortals; from Sichuan. Collection of Field Museum. Photo by Jo Humphrey.

Shadow theatre is an exotic performing art that reflects its mysterious Asian heritage. Its animated figures have universal appeal as they act out age-old legends on a back-lit screen.

The exact origin of this art form is impossible to pinpoint, but it probably began with simple hand shadows cast on a cave wall by the light of a flickering fire. Because of its popularity in many Asian and Mideastern countries, from the Pacific to the Mediterranean, shadow theatre may very well have begun independently and concurrently in a number of regions.

Jo Humphrey is director of The Yueh Lung Shadow Theatre, Jackson Heights, New York.

Some scholars believe that shadow theatre had its beginnings in the area where the most intricate style of figures are to be found; the longer history, they propose, would have allowed for greater development. According to such reasoning, China may well have been the country of origin.

The first written reference in China to such use of shadow images was in the second century B.C. The Emperor Wu Ti is said to have been so grief-stricken over the loss of his favorite concubine that he could no longer carry out his imperial duties. To ease the emperor's sorrow, a court magician created a shadow figure of the deceased, projecting it on the wall of the imperial garden pavilion. The shadow was so lifelike, according to the account, that the emperor's grief was assuaged.

Like other Asian shadow traditions, those of China were originally associated with religious rituals. The shadow was thought to be one's soul and shadow figures were supposedly inhabited by departed spirits. Even today there is an aura of mysticism in shadow theatre, and as those experienced in this art form will attest, the figures sometimes seem to have a will of their own.

According to Chinese scholars, the first shadow figures were an outgrowth of papercutting, paper having been invented in China long before it was known in the West, and decorative papercutting having predated the development of shadow theatre. Silhouettes made of paper performed at night on a wall or side of a tent, illuminated by a torch. In time, figures moved behind a screen where their shadows were cast by an oil lamp. Jointed figures were created, making possible more action, though the figures remained black silhouettes.

By the twelfth century, the figures were being made of translucent animal skins—from sheep, donkeys, cows, even fish—that seemed to glow against the light. Further color was provided by means of vegetable dyes; modern figures are colored with ink.

For the Chinese there was a clear distinction between puppetry and shadow theatre. The two art forms did, in fact, originate independently, the former from three-dimensional sculpture, the latter from two-dimensional graphics. Shadow theatre is a ritualistic event as well as an educational and entertaining experience. Even in modern-day shadow

Figure of deer, possibly from Southwest China, 18th century. Collected by C.F. Bieber in the 1930s and donated to the Field Museum collection. Photo by Diane Alexander White and David Rundell.

theatre we can see remnants of ancient ritual, such as greetings from gods and immortals as introductions to performances.

The hips, arms, and legs of all figures are jointed, and the limbs moveable. The head is detachable so that costumes may be changed; but in accordance with ancient supersitition, heads must be joined with bodies only during performances so that a character does not come alive except in the hands of the man or woman who manipulates it. The same superstition prevails in China's puppet and marionette theatres.

This forerunner of modern audiovisual media spread over the length and breadth of China. Some general features of the art form were to be found in all regions. Unlike Western drama, characters in Chinese shadow theatre were, for the most part, types rather than realistic figures endowed with individual personalities. But there are exceptions to this, which include certain supernaturals such as the Monkey King, a common character in traditional dramas.

Stylized, idealized facial characteristics were provided only in the carved profile. Comic characters had white circles around their eyes. Characters with complex personalities or supernatural powers had painted faces. Those who dwelt in heaven had uncarved features. Audiences could readily distinguish between almond-eyed heroes and round-eyed villains.

Backstage of shadow theatre. Photo by Evelyn Mei-huang.

Costumes and headdresses represented specific periods, the most common being of the Ming and Qing dynasties; these were carved in three-quarters view. Perforations accented design details. Officials wore so-called "jade belts"—large hoops about their waists. Generals had four flags on

Left to right: Mo Li-hai, one of the four heavenly kings. Wang Chi-chen, female figure in "The White Snake." Ts'ing She, the Black Snake in "The White Snake." Chung-li Ch'uän, one of the eight immortals. All in the collection of Field Museum. Photos by Diane Alexander White and David Rundell.

Four generals of heaven. East-city type figures (painted face characters). Gest Collection of Princeton University. Photo by Jo Humphrey.

their backs. Southern warriors wore pheasant plumes in their helmets. Proper ladies had small, bound feet while those of peasant women remained unbound.

Performances were invariably accompanied by music. Each region of the country developed its particular style of music as well as its own distinctive type of figure and performing tradition. Three basic traditions of shadow theatre are still being performed: Western, Southern, and Eastern.

The Western tradition (Yueh Qing) is closely allied to operatic forms of the Western regions of China, and the music is the same as that of local operas. Shadow theatre of these Western regions, in fact, is known as the "little opera." The 26-inch-high figures from the western province of Sichuan (Szechuan) are some of the largest, while those of Shaanxi (Shensi) and Shanxi (Shansi) Provinces, just northeast of Sichuan, include some of the smallest. Western figures consist of 14 or 15 separate

YUEH LUNG SHADOW THEATRE

Sunday, February 5
Two Performances: 1:00pm and 2:30pm
James Simpson Theatre
Members: $3.00
Nonmembers: $5.00

To order tickets use coupon on page 4

The White Snake. West-city type figure, carved by Yu Dze-an in 1850s. Collection of Field Museum. Photo by Jo Humphrey.

parts, including jointed hands, removeable hats, and beards of real hair; the faces have very rounded features and the outlines remain uncolored.

Three rods are used to manipulate these figures. A central control rod is attached across the shoulders, with the handle coming off the back. The other two rods are attached to the first joint of each hand.

The Field Museum has an extensive collection of Sichuan and other Western-style figures, collected for the most part by former Field Museum curator Berthold Laufer during his 1910-12 expedition to China. Some of these are on permanent view in Hall 32.

The Southern, or Chien Chao, tradition was centered mainly in the coastal provinces of Fujian (Fukien) and Guangdong (Kwangtung) and in the inland province of Hubei (Hupeh). In the beginning, Chien Chao was used only for religious rituals, including funerals and exorcisms. In use until about 1900, Fujian shadow figures were supplanted then by so-called "shadows in the round," represented by an exquisite form of horizontal rod puppet. Fujian culture came to what is now the island of Taiwan (formerly Formosa) over 400 years ago, and the Fujian shadow tradition has continued to survive in the city of Tainan, in the southern part of the island.

Southern figures are controlled by two rods, have fewer parts than most others, and only one moveable arm. There are various methods of rod attachment in these figures, the most common being the so-called "Fujian style," in which the rods are horizontal. One rod is attached through the top of the arm and shoulder, the other through the hand and wrist.

The Eastern, or Beijing, shadow theatre tradition was centered in the cities of Luanchou

Spotted deer. Collection of Field Museum. Photo by Diane Alexander White and David Rundell.

Scene from "Romance of Three Kingdoms." Photo by Jo Humphrey.

Emperor and concubine; West-city type figures carved by Yu Dze-an in 1850s. Collection of Field Museum. Photo by Jo Humphrey.

and Laoting in Hebei (Hopei) Province. In these cities guilds of craftsmen made shadow figures for many troupes. Possibly the oldest of the three traditions, the Eastern developed out of storytelling.

Figures of the so-called east-city type, formerly made in Luanchou but now made primarily in Tangshan, are 10 to 12 inches high. The black outline of the face emphasizes the long, sloping forehead and oval nostril. The eyebrow sweeps in a large arc that joins the outside corner of the eye with the forehead.

One of the largest collections of the east-city type is at the American Museum of Natural History, in New York City. This set was collected by Berthold Laufer between 1902 and 1904 before taking up his curatorial post at Field Museum, which also has a good representation of this type in its collection.

Laoting was the home of the west-city type, which is slightly larger than that from Luanchou—14 to 16 inches high. The eyebrows arch sharply into the straight forehead. Nostrils are not joined with the uncolored outline of the face. Perforations are more rounded than those of the east-city figures. The Lederschaft Museum in Offenbach, West Germany, has one of the largest collections of west-city figures, but in the Field Museum collection are several rare figures of this type made by Yu Dze-an, a craftsman of the mid-1800s. In east-city as well as

Lion figure. Collection of Field Museum. Photo by Diane Alexander White and David Rundell.

Left to right: Tu Ti, a local god disguised as a comic old man; East-city type figure made by Liu Chi Lin. Hsu Hsien (White Snake's husband) made by Hsien Yang Arts and Crafts Factory, Shaanxi Province in 1982. Fan Li-hua, female general, with her husband, Shi Ting-shan; East-city type figures made by Liu Chi Lin of Beijing Arts Factory. All figures from the collection of Jo Humphrey. Photos by Jo Humphrey.

west-city type figures the control rod is attached to the front of the collar and additional rods are attached to each hand.

Modern techniques in the Eastern shadow tradition were developed in Changsha, Hunan Province, in the 1940s. New figures with modern clothes were created to represent contemporary themes. Folk tales were rewritten to express Maoist ideology. Then, during the Cultural Revolution of the 1960s and 1970s, shadow theatre was virtually annihilated. After the Cultural Revolution the theatre flourished anew and a number of shadow players began rebuilding their troupes. They patterned figures and stages after the Hunan style, which was the only one to survive the turbulent 60s and 70s. Figures and shadow screens were enlarged

Scene from "The Mountain of Fiery Tongues." Photo by Jo Humphrey.

to accommodate larger audiences. Older traditions were also revived, thanks to surviving shadow masters (those in charge of troupes or who operated their own one-man theatres) and craftsmen.

Today there are at least 15 professional troupes that tour China, using newer-size figures illuminated by banks of fluorescent lights. Hundreds more semiprofessional and amateur troupes perform in almost every province. Only Xizang (Tibet) and the predominantly Moslem province of Xinjiang (Sinkiang) in extreme Western China have no shadow theatre.

Until recently, shadow theatre was the only Chinese performing art to use realistic scenery. Part of the enjoyment of watching a performance is to see the stories unfold in beautiful settings. Lovers meet in moonlit gardens, battle strategies are planned in elegant war tents, and plots are hatched behind red pillars carved with dragon motifs.

Shadow dramas reflect the whole scope of Chinese literature—folk tales, religious epics, and historic sagas. The typical shadow troupe had a repertoire of several hundred plays. Each shadow master interprets the literature in his or her own unique way, whether operatic or spoken. Audiences could often request their favorite plays. In *The Legend of the White Snake* a couple meet their fate in a drama illustrating Buddhist and Taoist principles. Dashing knights pit their military skills against invaders from other kingdoms in episodes from the great historical novel *A Romance of the Three Kingdoms*. During the Yuan dynasty (1271-1368) plays such as *The Orphan of Chao* and *Autumn in the Han Palace* were adapted for the shadow stage. Authors of other dramas of the same period wrote specifically for the shadow theatre. These plays often deal with social issues. A Ming dynasty novel, *Journey to the West*, provided numerous plots involving the mischievous Monkey King. His free spirit is symbolic of the unlimited potential for education and entertainment that Chinese shadow theatre offers. □

The mischievous Monkey King, rendered in modern Changsha style. Collection of Jo Humphrey. Photo by Jo Humphrey.

Scene from "The Fisherman's Revenge." Photo by Jo Humphrey.

CERAMICS OF THE SONG DYNASTY

(A.D. 960-1179)

by Yutaka Mino

Photos courtesy of the Asian Art Museum of San Francisco except where noted

Stoneware bowl, jun ware. Jin dynasty (1115-1234 A D). Height 8.9cm. Collection of the Shanghai Museum.

Song ceramics represent a culmination in the history of China's ceramic tradition, and in them we see a coming together of technical mastery and artistic sensitivity. The ceramics of this time cannot be regarded as a discreet body of material which appeared suddenly in full perfection, but rather as a high point in a continuum of development and as an expression of accumulated knowledge in the working of clay and glazes.

Song ceramic bodies are generally thinly thrown. Shape and thickness of rim and foot and detail work are carefully finished. The shapes of vessels, while widely varied and reflecting a willingness to experiment, are controlled throughout by a highly sophisticated aesthetic sense. In contrast to the abruptly turning and vigorously swelling outlines of Tang vessels, those of the Song for the most part seem quieter, more gently curvilinear and more stable.

The glazes of this period are of a subtlety never since matched. The serene colors and textures of the glazes and the restrained decorations used together with the simple, elegant forms produce a harmonious and graceful entity.

Many different methods of decoration were employed. Carving, engraving, combing (decorating the

Yutaka Mino is curator of Oriental Art at the Indianapolis Museum of Art and is serving as Field Museum's visiting curator for the exhibition Treasures from the Shanghai Museum: 6,000 Years of Chinese Art.

Jizhou ware vase. Jin dynasty (1115-1234 A.D.). Collection of Mr. and Mrs. Donald Heller. Photo by Robert Wallace, courtesy Indianapolis Museum of Art.

semidry clay with a comb), moulding, painting under and over the glaze and sgraffiato techniques (cutting away surfaces areas to reveal other color) including curving and scraping, were all used.

The Song dynasty saw a tremendous expansion in production of ceramics, a phenomenon which can be explained by a number of developments in China during this period. With the reunification of China under the Northern Song (960-1126), government sponsorship of mining and metalwork spurred the growth of industries. Coal was exploited as an important fuel in the North. The demand for high-quality

Vase, porcellaneous guan ware. Southern Song dynasty (1127-1279 A.D.). Height 13.9cm. Collection of the Shanghai Museum.

ceramics in the imperial court served as an impetus to the production of ever finer wares. Many kilns flourished around the area of the capital at Bianliang (modern Kaifeng).

As the country increased in wealth, more people were able to afford fine ceramic vessels for their own use. Patronage spread to the landowners and scholar-officials and also to the growing merchant class. Widely varied tastes can be seen in the numerous types of decorations used. Shape became more fluid and more functional and drew away from the forms of ceremonial wares used for funerary or tributary purposes.

The fame of Song wares spread and increasingly large numbers of ceramics were exported. These wares were produced primarily in southern China within reach of the seaports on the southern and southeastern coast. Many kilns were established in Fujian, Zhejiang, and Guangdong Provinces to supply the foreign trade. Port cities of Hangzhou, Ningbo, and Wenzhou in Zhejiang; Chuanzhou in Fujian; and Canton in Guangdong were lively ports which provided the government with sizable revenues in the form of customs duties.

The porcelaneous stoneware which predominated in the first years of the Song dynasty was Yue ware, produced in the state of Wuyue in southern China. When the King of Wuyue, Qian Shu, surrendered to the Northern Song dynasty in A.D. 978, Yue ware was at a peak in the history of its manufacture. In that year many objects were made in commemoration of the event, and these were to have a profound influence on the decoration of early Northern Song wares. Made for tribute and for the personal use of the Wuyue ruler, Yue ware waned in importance and deteriorated in quality after his abdication; but it continued to be produced well into the Song dynasty, as evidenced by a piece in the Percival David collection in London, dated the third year of Yuefeng (A.D. 1081). The rise of Longquan kilns in the South further contributed to the decline of Yue ware and can be traced in the decoration of Northern Song ceramics. In the early period of the dynasty, deeply carved relief decoration can be seen on celadons (ceramic ware notable for pale blue to pale greenish color) from Yaozhou, Shaanxi Province, and Cizhou-type ware found at Dengfeng Xian and Jiaozuo, Xiuwu Xian in Henan. Slightly later pieces of Yaozhou ware were not as deeply carved. Another important northern celadon ware, produced at Linru Xian, Henan Province, consisted mostly of moulded and stamped pieces. Ding ware, which originated in the late Tang, was essentially a plain white ware with bluish-white glaze. In the early Song it, too, was carved, at first quite deeply and later more lightly. Moulded and stamped decorations also appear on later Ding ware. This interesting parallel in the development of the different types of ware shows that their development was not altogether distinct one from another, as might easily be inferred from the fact that they came from separate kilns.

The development of other ceramic wares produced in the North was not influenced by Yue ware. For instance, Jun ware, first manufactured in the Northern Song period, was produced at a number of kilns, notably that at Yu Xian in Henan Province, and reflects no southern influence.

In the South many kilns grew up to feed the foreign market. After the court moved south to Linan (modern Hangzhou), ceramic production received an added stimulus. Just before the withdrawal from the

North, during the reign of Huizong (1101-25), the manufacture of ceramics had flourished along with other areas of artistic and cultural achievement. Under Huizong the highly acclaimed Ru and Northern Guan wares were perfected. After being driven south by the Jurchens and reestablishing the capital at Hangzhou in 1127, the Emperor Gaozong ordered the construction of new Guan kilns on the outskirts of the capital at Xiuneisi and later at Jiaotanxia.

Potters from the North were also imported to the South. The influence of northern styles is apparent at Jizhou kilns in southern Jiangxi.* Feng Xianming, of the Palace Museum of Beijing, has pointed out the possibility that potters from the kilns producing Cizhou type ware went to Jizhou potteries. The latter, in turn, influenced the decoration of early blue and white ware of nearby Jingdezhen later in the Yuan period. Ceramic production of both white wares and celadon at Jingdezhen is known to have begun in the late Tang period. In the Song dynasty Jingdezhen was the center of production of Qingbai, or Yingqing, ware.

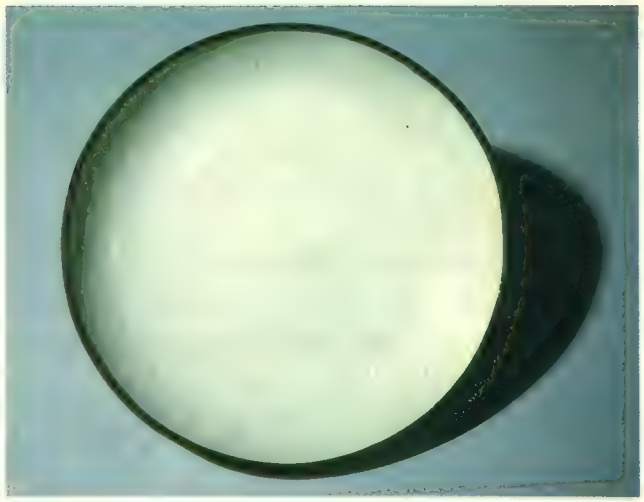
Celadons were produced in large quantities in the Longquan area in southern Zhejiang Province and also around Chuanzhou and Dongan in Fujian Province. Countless thousands of pieces were exported to Japan, Southeast Asia, and the Near East during the Song dynasty and through the Ming period (1368-1644).

So-called black Jian ware was made in Fujian Province, and developed especially in connection with the growing emphasis on tea bowls. It is distinctive for its purplish brown, nearly black, body and the uncanny glaze effects, known as "oil spot" and "hare's fur," induced during firing. Large numbers of Jian tea bowls were sent to Japan.

After 1127, as the center shifted to the South, the North saw a decline in the previously high standards of ceramic craftsmanship. Kilns continued to operate but their products were cruder, appealing more to popular tastes and needs. This trend continued into the Yuan dynasty (1171-1378), when ornament of a more forceful and naturalistic character appeared.

In many areas of artistic and cultural activity, the Song dynasty was a highly productive period with elevated artistic standards and sophisticated tastes. The ceramics of this period embody those qualities in their simple, elegant shapes and luminous monochrome glazes. Technique, though highly developed, was subordinated and controlled by a restrained sense of beauty. Virtuousity was never displayed for its own sake, as is often the case in later Chinese ceramics. □

*The finest assemblage of Jizhou ware outside of China is to be found in the collection of Field Museum.



Porcelain plate with molded design of dragon and clouds; ding ware. Northern Song dynasty (960-1127 A.D.). Diameter 23.3cm. Collection of the Shanghai Museum.

Porcellaneous vase with pierced ears; ge ware. Southern Song dynasty (1127-1279 A.D.) Height 10.1cm. Collection of the Shanghai Museum.

Why Are there So Many Kind

by William Burger
Chairman, Department of Botany

Photos by the author

In 1959 G. Evelyn Hutchinson, noted authority on freshwater life, published a scientific paper titled "Homage to Santa Rosalia, or why are there so many kinds of animals?" Hutchinson had visited Sicily, where he had come upon the shrine of Santa Rosalia. Below the shrine in a small pool he found and collected two species of water beetles, one somewhat smaller than the other.

The discovery of these beetles coexisting in the same small body of water set him to thinking and eventually led to his writing the article. Few scientific papers ask the really big questions (fewer still are dedicated to saints), but Hutchinson's article proved to be especially stimulating and has been followed by a great number of studies and articles devoted to aspects of the question he raised. No matter where one looks, whether in a midwestern prairie, a deciduous forest, or a tropical rain forest, the world seems incredibly rich with different kinds of plants and animals.

How can we approach such a broad subject as species diversity or, to be a bit more precise, species richness? Perhaps the simplest way is to divide the broad question into two that are more narrowly phrased: (1) how do a great many species manage to live together in the same biological community, and (2) what factors caused such diverse communities to come into being? The following discussion concentrates on the first question; we can leave the second question for another time.

Among the many points made by Hutchinson in his article was that life on land far outnumbers the species of plants and animals living in the oceans. Despite the fact that our planet's surface is only about 30 percent land, perhaps 80 percent of all species are terrestrial. Beetles alone number over a quarter-million named kinds, and since the vast majority of these and other insects are terrestrial, it is easy to account for the relatively large size

A prairie meadow at Illinois Beach State Park. Many prairie plants flower for only a few weeks over the May-to-September flowering season, thus reducing competition for pollinating insects

# of Plants and Animals?

of the land biota. A more fundamental reason for this disparity is that the land surface has a far greater variety of habitats than does the ocean. Within the medium of ocean water, there is nothing equivalent to the seasonally dry habitats or the great variety of temperature and rainfall patterns that prevail on land. The ocean, furthermore, is continuous; there are no totally separate parts. The land, on the other hand, is fragmented and discontinuous. There is no marine biota as distinctive as the land biota of Australia. In any event, we do no injustice to the topic of diversity by confining ourselves to life on land; that is where the greatest numbers occur.

Even confining the discussion to land communities gives us a multifaceted problem. The late plant ecologist Robert Whittaker suggested that we keep separate the diversity we find in a particular woods or prairie or mountaintop from the diversity we encounter as we move from one kind of habitat into another. It seems easy to understand that different species will inhabit only swamp, or woodland, or open field. It is the local diversity of a single habitat, which he called 'alpha diversity,' that merits our attention. How is it that a great many species seem able to live together in the same habitat at the same time?

Careful studies by numerous biologists have given us a partial answer to this question: many species may be living together, but they are not utilizing the same resources in the same way. The disparity in size of the two water beetles found by Hutchinson in the little pool indi-

Open grasslands in East Africa support a great variety of large mammals. Different ways of utilizing the vegetation and different ways of hunting allow diverse herbivores and carnivores to share the same habitat.

cated that they were utilizing the resources of that pool in different ways. Similarly, lions, leopards, cheetahs, and the smaller cats of the African plains tend to hunt different classes of prey and hunt in different ways. Also, many species are specialists. The chemical defenses of the monarch butterfly's caterpillar can detoxify the chemical defenses of its food plant, the milkweed; one rarely finds the monarch caterpillar feeding elsewhere and one rarely finds other kinds of caterpillars chewing on milkweeds. Though it is often difficult to see, many plants are best adapted to a particular soil type, type of exposure or climatic zone.

In addition to utilizing different resources or different microhabitats, plants and animals can also divide the year amongst themselves. Plants of our prairies avoid competition for pollinators by dividing the flowering season. One cannot appreciate the flowers of the prairie in a single visit; every few weeks new species come into bloom as others finish their period of flowering. In the evergreen tropics such flowering periodicity can occur throughout the year or take place in very irregular intervals over a number of years. But the message is the same: it is the division of resources, in time as in space, that allows many plants and animals to share the same environment.

Little animals provide many fine examples of dividing the habitat. We ourselves are sometimes inhabited by two species of lice; their names tell us where to look for them: the head louse and the body louse. Many insects feed exclusively on certain plant parts with the same selectivity as animal parasites. It has been estimated that two common species of oak trees in England are essential to the completion of the life histories of 128 different species of insects, each of which utilizes a particular part or parts of the oak plant in its individual way.

But can we explain local diversity entirely on the basis of each coexisting species having slightly different requirements? Probably not, especially in plants which are passively dispersed and cannot move once they are rooted. As one walks through a forest rich in species of trees, one has the impression that most trees are not site-specific and that a given site, if cleared, might support any number of species. This is especially true in some tropical rain forests where as many as 300 different kinds of trees coexist within a few acres on similar soil and slope. One explanation offered to explain this richness of trees is that insect predators, specializing on the seeds of particular species of trees, destroy the seeds that have fallen near the parent tree, resulting in a widely scattered pattern of species occurrence. A few researchers have found support for this view; most analyses, however, report clumped patterns of tree species occurrence, contradicting the seed-predation hypothesis. In fact many studies have found irregular, almost random patterns of species distributions within these tropical forests. These nearly random patterns suggest that chance events may play an important role in the success of these tropical trees.

Milkweed plants are protected by chemical toxins in their milky sap. The caterpillar of the Monarch butterfly is able to sequester these toxins; few other insects have this ability.

Why should chance play an important role in the life of a giant tropical tree? It appears that in many instances the success of a small seedling or sapling on the floor of the rain forest will be determined by whether or not a nearby forest giant comes crashing to the ground. These canopy trees create light gaps when they fall, and being near the source of bright light may be the most important factor in the further growth of rain forest seedlings and saplings. The tree falls, which are largely unpredictable, may be a major reason why so many large trees can coexist; you don't have to be a specialist or a superior competitor when success is largely a matter of chance. A similar argument has been made for the diversity of some fishes on coral reefs. Unpredictable tropical storms can break up parts of the reef, and being the first to recolonize may be largely a matter of chance. On land, larger scale disruption, such as that caused by landslides or major floods, also promotes diversity by ripping apart mature vegetation and beginning the process of revegetation all over again.

Chance disruption and unpredictable variations in temperature and rainfall may help explain why "superior competitors" haven't taken over more of the landscape. Without disruptive fires, many of our midwestern prairies would revert to woodland. Without storm and flood, fewer open sites would be available for pioneer species. We may grumble about our weather and how it varies, but such variation is essential to maintaining the diversity of life around us. If it were not for the year that was unusually cold, unusually wet, unusually dry, or unusually changeable, we might not have so many species of plants and animals living in the same environments.

Too much disruption, however, can cause drastic declines in the number of species. Africa is relatively poor in the number of plant species, a condition that may be the result of a severe dry period in the past. Areas in Southeast Asia subject to recurrent seasonal typhoons (which are very similar to our hurricanes) have forests poorer in species than areas outside the typhoon zone. Likewise, excessive predation or overgrazing can cause severe reduction in species numbers. But smaller amounts of predation and light grazing activity seem to enhance species richness. Careful observations in England showed that fields *decreased* in plant diversity when rabbits were removed or reduced by disease. The rabbits apparently browsed some of the more vigorous and dominant plant species, thus allowing other plants to maintain themselves. The conclusion from these and many other similar observations is that too little disruption reduces diversity (the top competitors take over) and too much disruption also reduces diversity (a majority of species cannot survive).

To sum up, the answer to our question seems to be a multifaceted one. Different specializations and different requirements allow many species to live together. In addition, predation, disease, and minor disturbance keep the superior competitors in check, providing openings for others. All this takes place in an environment in which rainfall and temperature also vary, often unpredictably. Taken together, these many factors result in a highly dynamic biota, and it is these dynamic, often unpredictable, components that support the great richness of plants and animals we find in many environments. □

TOURS FOR MEMBERS

EGYPT
Wonders of the Nile
January 31-February 16
$3,375

An unforgettable in-depth visit to the Land of the Pharaohs, including an 8-day Nile cruise aboard the luxurious *Sheraton Nile Steamer.* The tour leader is Dr. Bruce Williams, a distinguished U.S. Egyptologist. Dr. Williams is an expert in archaeology and ancient history. He will travel with the tour throughout, including the Nile cruise, and personally conduct all lectures and sightseeing. Highlights of our tour will be the pyramids and Sphinx of Giza, little-visited monuments of Middle Egypt, King Tut's tomb, the holiday resort of Aswan, and a visit to Abu Simbel.

ALASKA NATURAL HISTORY TOUR
June 1984
$4,185

Experience the Great Land. Descriptions of Alaska are filled with superlatives—a state more than twice the size of Texas with a population less than that of Denver, 33,000 miles of coastline, 119 million acres of forest, 14 of the highest peaks in the United States culminating in Mt. Denali (formerly Mt. McKinley), at 20,320 feet. Alaska is equally a land of wildlife superlatives, from her great herds of caribou to swarming seabird rookeries to surging salmon in migration. When one thinks of Alaska one thinks of wilderness, of nature still fresh and undomesticated, of experiences dreamed of but mostly unavailable to us of the lower 48.

Join us in June 1984 for an Alaskan odyssey through a wide range of habitats from the rockbound fur seal and sea bird colonies of the Pribilofs, to the dripping forest and calving glaciers of the southeast, to the grandeur of the Alaskan Range, to the Fjordlike quiet and beauty of the inland passage.

Our travels will be by plane, train, bus, boat, horseback, and foot—whatever best enhances our experience. Emphasis will be on the land, its history, its wildlife. Interpretation combined with direct observation will provide an enjoyment and quality of experience unavailable to the casual visitor. Whatever your interest in natural history—marine mammals, birding, mountains, photography, flowers, forests, glaciers, rivers—this tour will show you Alaska in all its diversity and splendor.

The tour will be led by Dr. Robert Karl Johnson, Chairman of the Department of Zoology of Field Museum.

TROPICAL MARINE BIOLOGY
Exploration of Isla Roatan
February 15-24
$1,450

Crystal clear water, magnificent coral reefs, and a fantastic diversity of marine life are characteristics of the coast of Roatan, the largest of the Bay Islands in the Gulf of Honduras and some 30 miles off the Central American coast. Field Museum will conduct a 10-day tour to Roatan especially for divers that will combine superlative diving, expert instruction in marine natural history, and an opportunity to observe or actively participate in the scientific collecting of fishes.

An outstanding attraction for divers is spectacular "drop-offs" whose tops extend into depths as shallow as 25 feet.

Leading the tour will be two ichthyologists with more than 10 years experience in the Caribbean as teachers, divers, and researchers: Dr. Robert Karl Johnson, curator of fishes and chairman of Field Museum's Department of Zoology; and Dr. David W. Greenfield, professor of biological sciences and associate dean of the Graduate School at Northern Illinois University. Illustrated talks about marine ecosystems will be combined with field trips to observe habitat types.

Accommodations will be at the Reef House diving resort on Roatan. The price of $1,450 covers all travel, lodging, and meals at the Reef House, and two or three tank dives per day.

GRAND CANYON ADVENTURE
May 25 - June 3

An exciting 280-mile cruise down the Colorado River by motorized rubber raft, camping outdoors under the stars. Dr. Bertram G. Woodland, curator of petrology, will lead the tour. Group limited to 25. For additional information call (322-8862) or write the Tours Office.

ADDITIONAL TOUR GEMS SLATED FOR 1984

- China and Tibet
- Kenya
- Peru
- England's Old Inns, Old Homes, Old Castles, and Old Gardens. Please ask to be on our mailing list if any of these tours is of interest you.

For additional information on any tour, please call Tours Manager Dorothy Roder at 322-8862 or write Field Museum Tours, Roosevelt Road at Lake Shore Drive, Chicago, IL 60605.

OUR ENVIRONMENT

Study of Children's Attitudes Toward Animals

If you think kids and wild creatures naturally go together, think again. A recent study among school children in Connecticut suggests that, like many a love affair, the one between children and animals is bittersweet, at best. The pioneering study, sponsored by the U.S. Fish and Wildlife Service and Yale University, did not attempt to analyze the attitudes of children nationally, but provides a provocative glimpse into how our perceptions of wildlife may evolve through the childhood years.

The study of "Children's Attitudes, Knowledge, and Behaviors Toward Animals" was conducted by Stephen R. Kellert of Yale's School of Forestry and Environmental Studies and Miriam O. Westervelt of the Fish and Wildlife Service. It included nearly 300 second, fifth, eighth, and eleventh grade students who represented all major demographic and geographic divisions within Connecticut. The survey was the final phase of a large, five-part study of Americans' knowledge and attitudes toward wildlife commissioned by the Interior Department agency.

The survey found:

- Like adults, the most common attitude among children was a "humanistic" one—that is, a strong affection for individual animals, mainly pets;
- The "naturalistic" appreciation for wildlife and the outdoors was much more common in children, especially eleventh graders, than in adults. For example, 59 percent of eleventh graders indicated a preference for being near wild animals while camping, against only 36 percent of adults surveyed by Kellert in an earlier study;
- Children were just as likely to express a general dislike or fear of animals as that "naturalistic" appreciation, however. Younger children feared wild animals to a much greater degree than did older classmates.
- Children, particularly those in the upper grade levels, disapproved of sport hunting. Like adults, they approved of hunting for meat, however. Fully 81 percent of eleventh graders (and 62 percent of adults) opposed sport hunting, while 60 percent of all children (and 85 percent of adults) approved of hunting for meat;
- Although children's knowledge of animals was relatively limited, in certain specialized areas, like insects, children knew more than adults. Seventy-eight percent of children knew that spiders are not 10-legged creatures, as against 50 percent of adults, for example.
- There are distinct stages through which children's attitudes toward animals evolve, the authors suggest. Between second and fifth grades, children showed a dramatic increase in their concern, sympathy, and affection for animals. Interests in animals became less narrow and early childhood fears began to disappear. Between fifth and eighth grades, factual knowledge about animals showed its greatest increase. From eighth to eleventh grades, children gained a deepening concern for wildlife protection, a greater understanding of ecological concepts, and a relatively high moral concern for animal rights and cruelty issues.
- Girls expressed a greater emotional affection for animals than did boys, and whites had a greater general interest in animals, particularly wildlife, than did nonwhites. Boys, whites, and rural residents possessed far greater factual knowledge about animals than did groups of other children.
- Most children said they go to the zoo (93 percent), own a pet (87 percent), go fishing (87 percent), learn about animals in school (83 percent), feed birds (82 percent), and read about animals (76 percent). Whites were more likely than nonwhites to participate in activities involving animals, in general. Rural children engaged in more domestic animal activities, as well a hunting, fishing, and trapping. Girls exceeded boys in their participation in only one activity—birdwatching.

Sampson's Pearly Mussel

The U.S. Fish and Wildlife Service (FWS) has proposed that the Sampson's pearly mussel be removed from the endangered species list in the face of overwhelming evidence that the creature no longer exists. Originally identified and described in 1861, the mussel inhabited the lower reaches of the Wabash River in Illinois and Indiana, and possibly parts of the Ohio River in the general vicinity of the Wabash and Ohio confluence. It was placed on the U.S. list of Endangered and Threatened species on June 14, 1976.

Extensive searches have failed to turn up a living specimen during the past 50 years, leading to the conclusion that it is extinct. The mussel apparently occupied only gravel and sand bars, which were destroyed over the years by siltation that resulted from dredging and the construction of dams. A decline in water quality as a result of an inflow of chemicals from industry and agriculture is also believed to have contributed to the mussel's extinction.

Stephen didn't think he needed a will. He was only 51. . . .

Stephen intended to have his will drawn up someday; first, there were things to get done. He had no idea he would need a will anytime soon—before he got those "things" done. A will is like life insurance: when you need it, it's too late to do anything about it.

Now, Stephen's family is facing unnecessary delays, confusion, and extra expenses in settling his estate.

Don't make the same mistake. Send for our complimentary booklet giving all the reasons why a will is important and how you can plan an effective will.

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Index to *Field Museum of Natural History Bulletin*, Volume 54 (1983)

Articles

Archaeological Reconnaisance in Southern Peru, by Charles Stanish and Irene Pritzker: Je 6
Archaeology around the Shores, by Kevin McGowan and Thomas J. Riley: My 20
Athapaskan Indian Clothing in the Collections of Field Museum, by James VanStone: A 22
Biennial Report for 1981-82: J/A 5
Botanical World in Replica, The, by Michael O. Dillon and Beverly Serrell: S 5
Bryophyte Collecting in the Bolivian Andes, by Marko Lewis: S 11
Clean-up for the Mediterranean, by Norman Myers: F 34
Collecting in the Upper Amazon, by Timothy Plowman: Mr 8
Earliest Plants on Land, The, by Peter R. Crane: O 20
Eastern and Western Traditions in Hand Papermaking, by Timothy Barrett: My 10
Ecological Studies of Tropical Cicadas, by Allen M. Young: Je 20
El Niño: Recent Effects in Peru, by Robert Feldman: S 16
Fuertes in Abyssinia, by R. M. Peck: A 6
Geology and Creationism, by David M. Raup: Mr 16
Industrial Miracle in a Golden Age, An: the 17th Century Cloth Exports of India, by Bennett Bronson: Ja 12
Inside Story on Fossil Plants, The, by Peter R. Crane: N 10
Journal of Wilfred Osgood, The; intro. by Bruce Patterson: F 8
Layman's Guide to Resources, Reserves, and Recovery, by Edward Olsen: Ja 8
Patronage of Tz'u Chou Type Wares, by Yutaka Mino: My 16
Plants of the World Photography Competition: O 11
Plants that Lie and Cheat (Well Almost), by William Burger: F 23
Precolumbian Murals in a Mexican Church, by Terry Stocker and Barbara Jackson: F 14
Remarkable Maguey, The: Myth and Reality, by Terry Stocker and Barbara Jackson: S 19
Sea Snakes: Mark, Release, Recapture, by Harold Voris, Helen Voris, and William B. Jeffries: O 5
Sixth Annual Anthropology Film Festival: N 13
Thinsections: A Natural Art Form, by Edward Olsen: A 19
Tradition of Chado—The Way of Tea: My 8
Treasures from the Shanghai Museum—6,000 Years of Chinese Art, by Yutaka Mino and Katherine R. Tsiang: N 5

Authors

Barrett, T.: *Eastern and Western Traditions in Hand Papermaking*, My 10
Bronson, B.: *An Industrial Miracle in a Golden Age: the 17th Century Cloth Exports of India*, Ja 12
Burger, W.: *Plants that Lie and Cheat (Well Almost)*, F 23
Crane, P.R.: *The Earliest Plants on Land*, O 20
————: *The Inside Story on Fossil Plants*, N 10
Dillon, M.O.: *The Botanical World in Replica*, S 5
Feldman, R.: *El Niño: Recent Effects in Peru*, S 16
Jackson, B.: *Precolumbian Murals in a Mexican Church*, F 14
————: *The Remarkable Maguey: Myth and Reality*, S 19
Jeffries, W.B.: *Sea Snakes: Mark, Release, Recapture*, O 5
Lewis, M.: *Bryophyte Collecting in the Bolivian Andes*, S 11
McGowan, K.: *Archaeology around the Shores*, My 20
Mino, Y.: *Patronage of Tz'u Chou Type Wares*, My 16
————: *Treasures from the Shanghai Museum—6,000 Years of Chinese Art*, N 5
Myers, N.: *Clean-up for the Mediterranean*, F 34
Olsen, E.: *A Layman's Guide to Resources, Reserves, and Recovery*, Ja 8
————: *Thinsections: A Natural Art Form*, A 19
Patterson, B.: *The Journal of Wilfred Osgood* (intro.), F 8
Peck, R.M.: *Fuertes in Abyssinia*, A 6
Plowman, T.: *Collecting in the Upper Amazon*, Mr 8
Pritzker, I.: *Archaeological Reconnaisance in Southern Peru*, Je 6
Raup, D.M.: *Geology and Creationism*, Mr 16
Riley, T.J.: *Archaeology around the Shores*, My 20
Serrell, B.: *The Botanical World in Replica*, S 5
Stanish, C.: *Archaeological Reconnaisance in Southern Peru*, Je 6
Stocker, T.: *Precolumbian Murals in a Mexican Church*, F 14
————: *The Remarkable Maguey: Myth and Reality*, S 19
Tsiang, K.R.: *Treasures from the Shanghai Museum—6,000 Years of Chinese Art*, N 5
VanStone, J.: *Athapaskan Indian Clothing in the Collections of Field Museum*, A 22
Voris, Harold: *Sea Snakes: Mark, Release, Recapture*, O 5
Voris, Helen: *Sea Snakes: Mark, Release, Recapture*, O 5
Young, A.M.: *Ecological Studies of Tropical Cicadas*, Je 20

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FIELD MUSEUM OF NATURAL HISTORY BULLETIN
February 1984

Coming March 10:
ESKIMO ART AND CULTURE
Feb. 19—***DANCE OF WEST AFRICA: NAJWA DANCE CORPS***

Field Museum of Natural History Bulletin

Published by
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Founded 1893

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CONTENTS

February 1984
Volume 55, Number 2

February Events at Field Museum 3

Eskimo Art and Culture 5
Coming March 10: *Inua: Spirit World of the Bering Sea Eskimo* and *Grasp Tight the Old Ways: The Klamer Family Collection of Inuit Art*

Images of Yap 20
by Robert B. Pickering
Program Developer, Department of Education

Sealskin Bags of Unusual Construction from the Bering Strait Region 23
by James W. VanStone
Curator of North American archaeology and ethnology

Field Museum Tours 27

Cover

Spirit with Young, *green stone and ivory sculpture by Shorty Killiktee. 24.5 x 14.3 x 14.4cm. This sculpture is among 175 contemporary prints, drawings, wall hangings, and other sculpture that will be on view at Field Museum March 10 through May 27. Entitled "Grasp Tight the Old Ways: The Klamer Collection of Inuit Art," the exhibit comes from the Art Gallery of Ontario and will be shown concurrently with "Spirit World of the Bering Sea Eskimo," organized by SITES, Smithsonian Institution Traveling Exhibition Service. See pages 5-19.*

Photo courtesy Art Gallery of Ontario, gift of the Klamer Family, 1978. Reproduction restricted. Copyright held by sculptor and protected by Canadian Eskimo Arts Council, Ottawa, Canada.

VOLUNTEER OPPORTUNITIES: If you have a good mind for detail and can give one day a week, there may be a volunteer job for you in our Zoology or Geology department. Other volunteer opportunities include jobs in Membership, Building Operations and departmental libraries. Clerical skills are needed in almost every area of the Museum.

Events

Yueh Lung Shadow Theatre

Sunday, February 5
1:00pm and 2:30pm
James Simpson Theatre

Shadow theatre is a performing art more than 2,000 years old. The Yueh Lung Shadow Theatre is the only one of its kind in the United States. The company uses Peking-type figures which are constructed by members of the troupe. The performances feature Chinese shadow puppets maneuvered by professionals and illuminated on a screen. The puppets recreate stories of Chinese life and legend. During the performance, the stories and the use of the puppets are explained.

Because the number of seats for each performance is limited, advance purchase of tickets is recommended. These performances are partially funded by a grant from the National Endowment for the Humanities, a federal agency.

Members: $3.00
Nonmembers: $5.00
Use coupon to order tickets.
Fees are nonrefundable.

"African Lifestyles"—Film Series

Africa is a land whose population has more distinct cultures than any other continent. These free films focus upon the diversity of African lifestyles.

February 11, 1:00pm
***Masai: Warrior Between Two Worlds** (30m)*
Traditional culture clashes with the modern world in this documentary of life among the Masai of East Africa.

***Nawi** (22m)*
During the dry season, the Jie of Uganda leave their homesteads and take their cattle to temporary camps, the *nawi*.

February 18, 1:00pm
***Talking Drums** (17m)*
An intimate view of a master drum-carver examines the significance drums hold for the Ashanti of West Africa.

***Gelede: A Yoruba Masquerade** (24m)*
An impressive, colorful Nigerian mask dance-drama is enacted to combat the forces of witches and to reinforce definitions of men's and women's roles.

February 25, 1:00pm
***The Nuer** (60m)*
Life among these East African herders revolves largely around their cattle, supplying their basic material and spiritual needs. Portrayed are a bride price dispute, a ghost marriage, a revivalistic ceremony to combat smallpox, and a young man's initiation.

These films are free with Museum admission and tickets are not required. Use West Entrance.

Dance of West Africa

Najwa Dance Corps
Sunday, February 19, 2:00pm
James Simpson Theatre

In an exciting mixture of dance, music, drama, and history, Najwa Dance Corps brings to you a performance which preserves the styles and techniques of different eras in African history. Najwa I is an internationally acclaimed dancer who has continued a tradition of teaching, performing, and artistic endeavors through the Najwa Dance Corps. The Corps performs the following suite of dances: "Diolli" and "Saba" from Senegal; "Liendien" from Gambia; "Manjaani," a social dance of West Africa; and "Wolofsodun," a slave dance from Mali.

Members: $3.00
Nonmembers: $5.00
For further information call (312) 322-8854.

CONTINUED→

Events

CONTINUED FROM PAGE 3

February Weekend Programs

Each Saturday and Sunday you are invited to explore the world of natural history at Field Museum. Free tours, demonstrations, and films related to ongoing exhibits at the Museum are designed for families and adults. Listed below are only a few of the numerous activities available each weekend. Check the *Weekend Passport* upon arrival for the complete schedule and program locations. The programs are partially supported by a grant from the Illinois Arts Council.

February

5 12:00noon ***Traditional China.*** Examine the timeless imagery and superb craftsmanship represented by Chinese masterworks in our permanent collection.

11 1:00pm ***Tibet Today.*** Slide lecture shows Lhasa and other towns now open to tourists, as well as Tibetan refugees who have carried their religion into the mountainous areas surrounding this ancient religious center.

12 12:00pm ***Museum Safari.*** Seek out shrunken heads from the Amazon, mummies from ancient Egypt, and big game from Africa.

18 11:30am ***Ancient Egypt.*** Investigate the traditions of ancient Egyptian civilization from everyday life to mummification and the promise of an afterlife.

25 1:30pm ***Himalayan Journey: A Faith in Exile.*** Slide lecture focuses upon the strongholds of Tibetan refugees in India: Dharamasla (home of the Dalai Lama), Darjeeling, and Sikkim.

26 12:30pm ***Museum Safari.*** Seek out shrunken heads from the Amazon, mummies from ancient Egypt, and big game from Africa.

These weekend programs are free with Museum admission and tickets are not required.

Family Feature

African Rhythms: A Living History

Babu Atiba, Musician
Saturday and Sunday,
February 4 and 5
12:00 noon, Hall E,
Cultures of Africa

The voices of African instruments sing history as well as music. The drum is considered essential throughout Africa and its sounds are often said to "talk." Babu Atiba is a well-known Chicago drummer who specializes in the music of West Africa. Join us as he shares his music and demonstrates such drums as the *djimbe* and the *djun djun.* Examine the variety of horns, harps, flutes, lutes, and drums in our collection and learn some of the rhythms that are the heartbeat of West Africa's music.

Family features are free with Museum admission and tickets are not required.

Registration

Please complete coupon for your program selection and any other special events. Complete all requested information on the application and include section number where appropriate. If your request is received less than one week before program, tickets will be held in your name at West Entrance box office until one-half hour before event. Please make checks payable to Field Museum. Tickets will be mailed on receipt of check. Refunds will be made only if program is sold out.

Program Title	Member Tickets #Requested	Nonmember Tickets #Requested	Total Tickets #Requested	Amount Enclosed
			Total	

Name

Street

City State Zip

Telephone Daytime Evening

Have you enclosed your self-addressed stamped envelope?

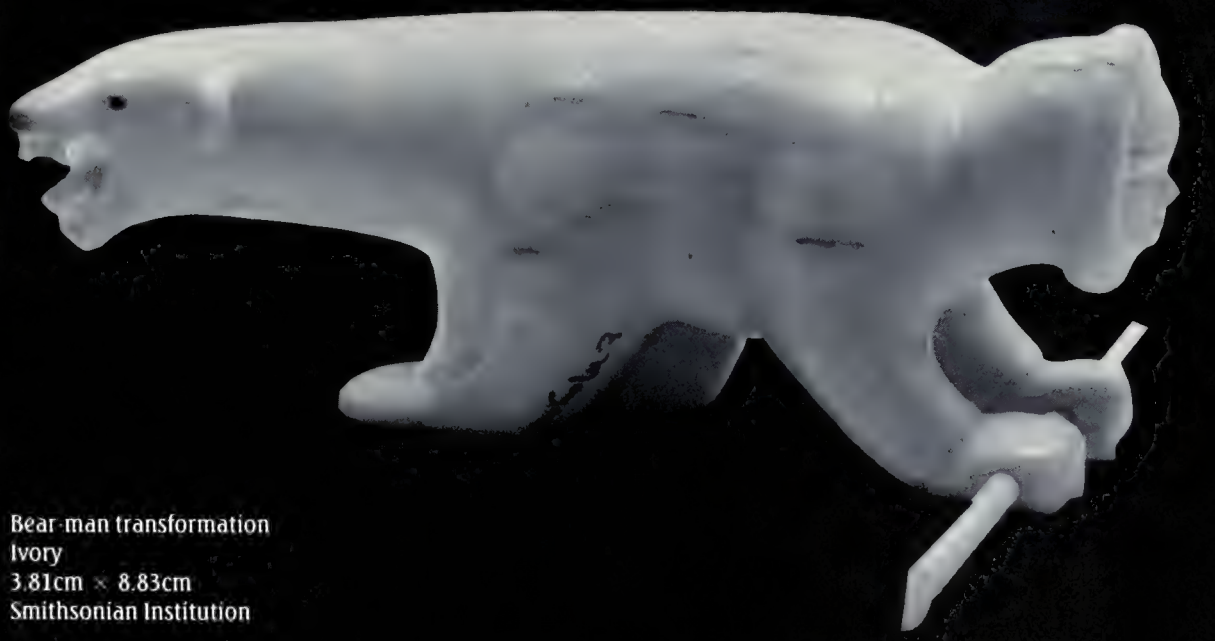
For Office Use:

Date Received **Date Returned**

Return complete ticket application with a self-addressed stamped envelope to:

Public Programs: Department of Education
Field Museum of Natural History
Roosevelt Road at Lake Shore Drive
Chicago, IL 60605-2497

Eskimo Art and Culture



Bear-man transformation
Ivory
3.81cm × 8.83cm
Smithsonian Institution

Two major exhibits
On view March 10 through May 27

INUA: SPIRIT WORLD OF THE BERING SEA ESKIMO
from The Smithsonian Institution

and

GRASP TIGHT THE OLD WAYS: THE KLAMER FAMILY COLLECTION OF INUIT ART
from the Art Gallery of Ontario

PHOTO BY JOEL BREGER

PHOTO BY JOEL BREGER

VISITORS TO FIELD MUSEUM THIS SPRING will have an opportunity to view two interesting exhibitions of Eskimo art and culture which open on March 10 and close on May 27. They encompass a wide area of the North American arctic and a period extending from the late nineteenth century to the present.

The first of these exhibits, curated by William Fitzhugh and Susan Kaplan, originated at the Smithsonian Institution. It is devoted to a collection of ethnographic material from the coast of western Alaska made for the National Museum of Natural History between 1877 and 1881 by Edward William Nelson.

Nelson went to Alaska as a weather observer and was assigned to the village of St. Michael on the coast north of the mouth of the Yukon River. During his tour of duty he traveled extensively and made a superb collection of ethnographic specimens numbering more than 10,000 items. These he described and illustrated in an important publication entitled *The Eskimo About Bering Strait,* published by the Bureau of American Ethnology of the Smithsonian in 1899.

Most of the artifacts collected by Nelson have never before been exhibited to the public. They include examples of the elaborate sea mammal hunting equipment characteristic of Eskimo culture, carefully constructed bentwood boxes painted with intricate designs having ceremonial significance, beautifully woven grass bags and baskets, carved ivory ornaments worn as personal adornment, and, most spectacular of all, the elaborate face masks of infinite variety which were an important part of the enactment of myths and stories and ceremonial presentations held in the *qasig,* or ceremonial house.

The Nelson collection is the largest and most complete assemblage of nineteenth century ethnographic material ever made in Alaska. The exhibit includes a representative sample of more than 250 specimens, many of which are among the finest examples of nineteenth-century Alaskan Eskimo art.

The second exhibit, entitled "Grasp Tight the Old Ways," was curated by Jean Blodgett and originated at the Art Gallery of Ontario in Toronto. It consists of selections from the Klamer family collection of contemporary Cana-

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Wedge for slitting feather quills
Ivory
19cm

Float plugs
Ivory
6cm, 5cm

Inua: Spirit World of the Bering Sea Eskimo

from the Edward W. Nelson Collection of The National Museum of Natural History/National Museum of Man Smithsonian Institution

Photos courtesy Smithsonian Institution

dian Eskimo (Inuit) art. Mr. and Mrs. Harry Klamer were first attracted to Eskimo art more than twenty years ago and became enthusiastic patrons. They not only acquired pieces of contemporary sculpture and graphics at exhibitions, but traveled to the north to meet native artists. Their desire to document the accomplishments of Eskimo artists and to make their works known to a wider audience led them to donate a portion of their collection to the Art Gallery of Ontario in 1978.

Most of the 175 pieces in the Klamer collection are contemporary prints, drawings, wall hangings, and sculptures made for sale by artists from some twenty Canadian Eskimo communities. Since the late 1940s and early 1950s, when Canadian Eskimos were first encouraged to produce sculpture and graphic art for a commercial market, there has been a tremendous increase in the interest in this unique art on the part of collectors, galleries, and museums all over the world. The Klamer collection is an excellent introduction to exciting art forms in which the artist's interpretation, although intensely personal, is rooted in the cultural traditions of the past.

The Inua and Klamer exhibits can be viewed in Hall 26 on the second floor. Authoritative and beautifully produced catalogs are available for both exhibits. The visitor may wish to compare the fine examples of Eskimo art and material culture exhibited in Hall 26 with those in the museum's new permanent exhibit "Maritime Peoples of the Arctic and Northwest Coast" in Hall 10. FM

Food tray and ladle
Wood with stone inlay
35.5cm (tray), 26.5cm (ladle)

Mask
Wood, feathers, root lashing
50cm

Flying bird effigy
Wood and feathers
53cm

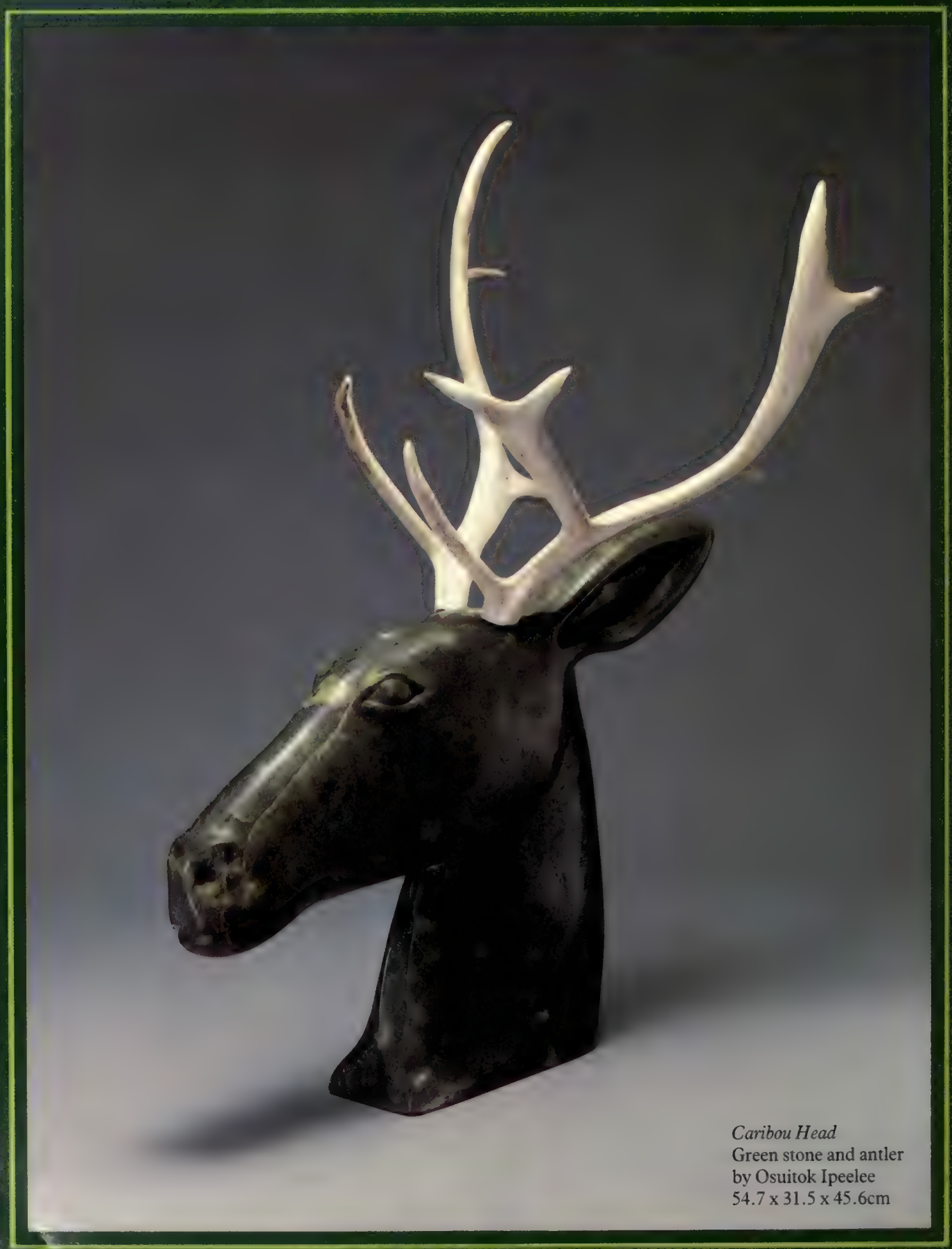
Male and female dolls
Bone, skin, and fur
17cm, 15cm

Snuff box
Wood, ivory inlay
10cm

Mask
Wood, feathers, and quills
48cm

Seal inua (spirit) mask
Wood, reindeer skin, fur
29cm

Bear inua (spirit) mask
Wood
30cm



Caribou Head
Green stone and antler
by Osuitok Ipeelee
54.7 x 31.5 x 45.6cm

Sea Goddess
Dark green stone, ivory, and baleen
by Nuveeya Ipellie
22.5 × 26.0 × 10.9cm

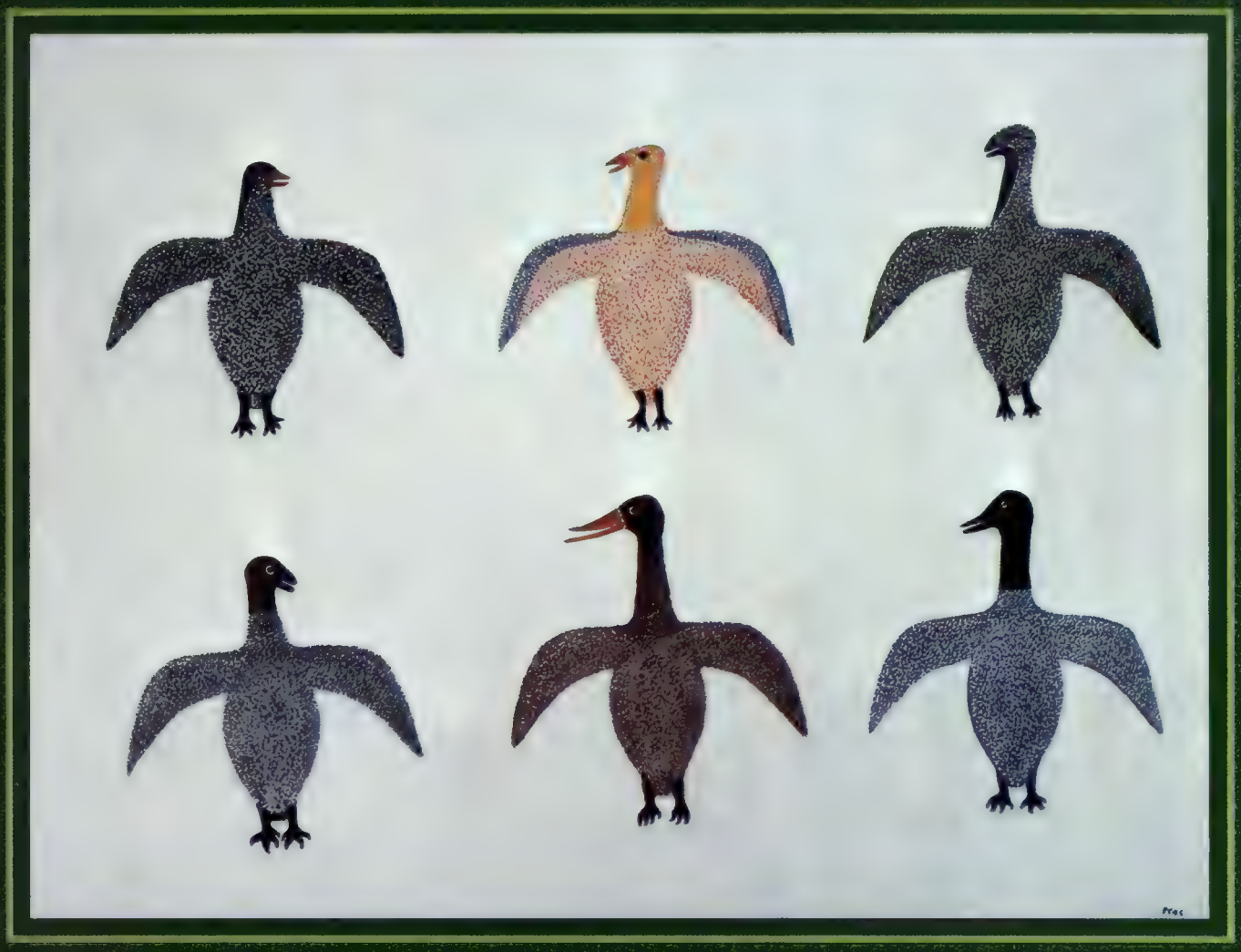
Grasp Tight the Old Ways: The Klamer Family Collection of Inuit Art from the Art Gallery of Ontario

Photos (pp. 14-19) courtesy Art Gallery of Ontario,
gift of the Klamer Family, 1978.
Reproduction restricted. Copyrights held by artists
and protected by Canadian Eskimo Arts Council, Ottawa, Canada.

Mother and Child with Kudlik
Dark green stone, ivory, light green stone, black stone, bone, and blacking
by Elijassiapik
14.0 × 21.5 × 24.7cm

Qiviuq's Journey
Stonecut and stencil
by William Noah and Martha Noah
64.0 × 94.0cm

Bird with Colourful Plumage
Felt-tip pen
by Kenojuak
50.7 × 66.3cm



Six Birds
Felt-tip pen and graphite
by Kingmeata
50.7 × 66.5cm

Images of Yap

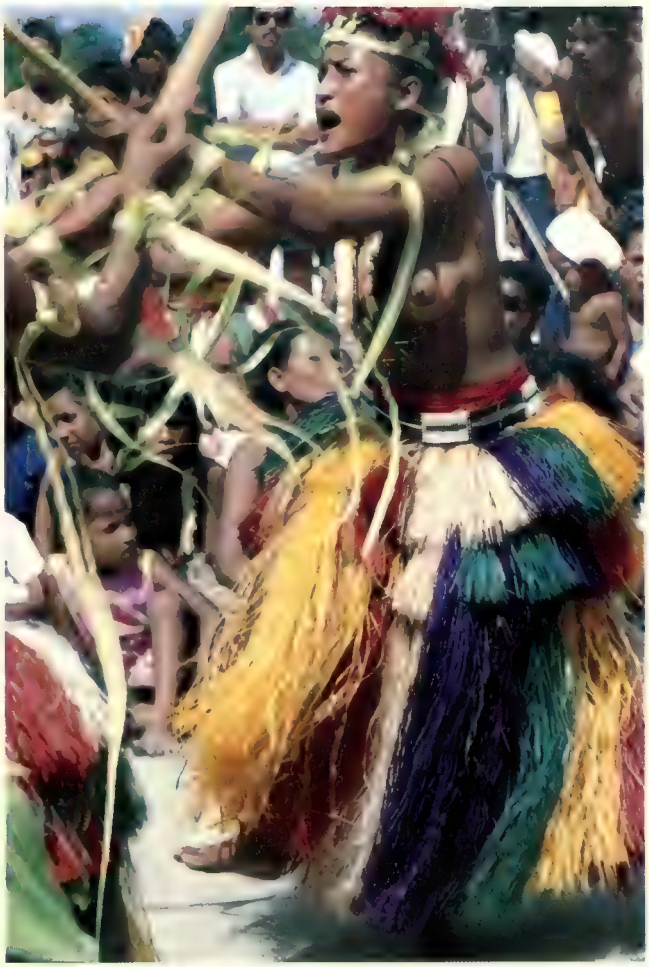
by Robert B. Pickering
Program Developer, Department of Education
Photos by the author, courtesy Nawrocki Stock Photo

Above: *Figrag, high chief of Lamaer, one of three high-cast villages on the island. Yap is one of the few communities outside of India where a rigid caste structure remains intact.* Left: *Gravestone of Japanese soldier is silent reminder of the early 1940s, when the island was occupied by Japanese forces.*

Yap is a 28-square-mile island in the Pacific's Western Caroline group and located about 800 miles due north of New Guinea. It recently became a member of the Federated States of Micronesia. The population is about 5,000.

In 1980, when Yap was still a U.N. Trust Territory, I had the opportunity to visit the island for five months, directing a federally funded mortuary site archaeology project. This was part of an environmental impact study prior to the construction of a proposed airstrip. In the course of my research there, I interviewed a large number of older Yap residents about mortuary customs. I also came to learn a great deal about their life in general—ceremonial activities, politics, and social structure, their economy, crafts, and other aspects of daily life that have remained little affected by inroads from developed parts of the world.

The photos reproduced here offer a glimpse of the beauty and character of this proud island community.



The girl above and the boy at left are participants in a gamel, *or bamboo dance. A standing dance adapted from the outer islands in the Yap district, it is unusually vigorous and done to the accompaniment of bamboo sticks struck together.*

Enormous carved "wheels" of ray ni ngocol, *or stone money—Yap's principal claim to world renown. This form of currency is used, for example, to buy a wife or to compensate the family of someone the payer has killed. The stone is quarried in Palau, some 300 miles to the southwest.*

Left: *Man and wife: 70-year-old Falanug and 58-year-old Mangayog before their neatly thatched sleeping house.* Lower left: *Basket-making can be done almost anytime, anywhere. Using palm fronds, these men fashion carrying baskets as they wait for a dance to begin. Their nimble fingers can create a large basket in 15 minutes.* Below: *Everyone comes to the dance—to perform or just to watch.*

Sealskin Bags of Unusual Construction From the Bering Strait Region

by James W. VanStone
Curator of North American Archaeology and Ethnology

Traditional Alaskan Eskimo bags and baskets were generally made from the skins of land and sea mammals or of dried grass. North of Norton Sound (see map) oblong, flat bags or satchels made of caribou or sealskin, usually with the hair on, were designed for holding tools and implements of all kinds. They had slightly arched handles of bone, ivory, or antler stretched lengthwise across the open mouth of the container.

From Norton Sound to the mouth of the Kuskokwim River, Eskimo women, using a simple twining technique, made mats and bags of dried grass. Large mats served as curtains to partition off part of a room or sleeping area while smaller ones were placed as seats in the manholes of kayaks. Most baskets fashioned by the Eskimos of western and southwestern Alaska were made by the coiling technique and intended to contain small household items. The technique of coiling appears to have developed relatively late since coiled baskets were not offered for sale to early explorers. In the early twentieth century, however, Eskimo women made them by the hundreds in response to a growing demand for souvenirs.

Four sealskin bags in the collections of Field Museum are of special interest because of their unusual construction. These bags do not resemble any of the forms just mentioned nor are similar containers described or illustrated in the existing literature on the material culture of

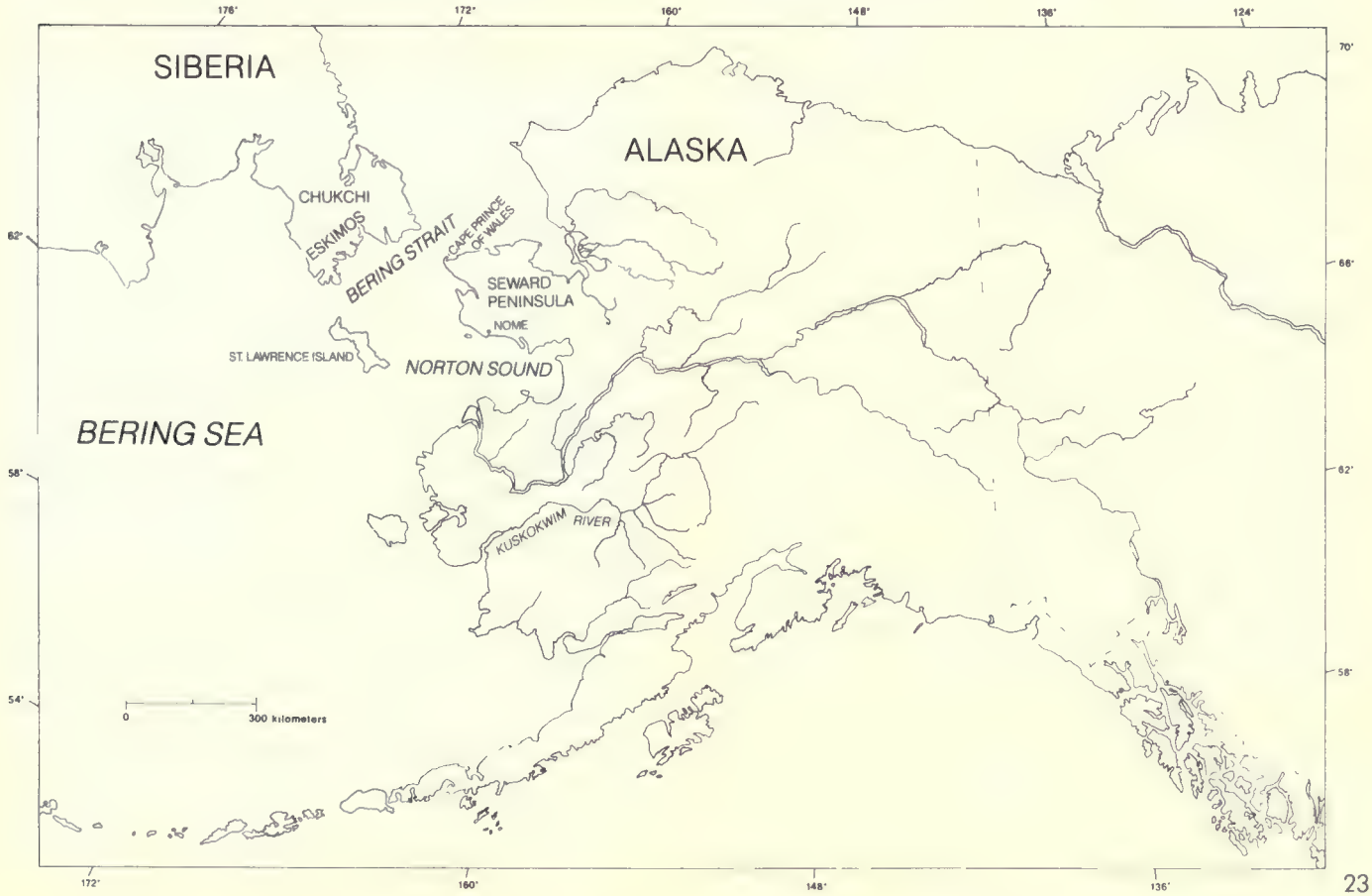


Fig. 1 PHOTO BY RON TESTA N108076

Alaskan Eskimos or the Eskimos and Chukchi of adjacent northeastern Siberia. Three of these bags were collected at Nome between 1900 and 1913 and purchased by the Museum in 1917. They are described in the catalog of the Department of Anthropology as "work or trinket boxes of skin." It is possible that they were containers for sewing equipment or jewelry.

Narrow strips of tanned bleached and unbleached sealskin, with the hair removed, were used in these containers. A detailed description of one of them will serve to make clear the unusual method of construction. This bag (catalog No. 27727, approx. 18cm high) has a flat bottom made from a single piece of unbleached sealskin (fig. 1). The sides flare evenly and constrict near the neck with an additional outward flare at the rim. The round sealskin lid is flat at the edges, raised and rounded toward the center, and has a vertical round knob at the top.

The bag is constructed of 24 narrow, folded strips of bleached and unbleached skin with the two colors alternating. Between each strip is a narrow welt of unbleached skin and the pairs of strips with intervening welts are sewn with sinew as shown in figure 2. The lid is similarly constructed of seven strips of skin separated by welts. A recessed eighth strip extends below the lid and fits into the bag opening. Figure 3 illustrates how the center section of the lid is built up to a round piece at the top. The knob consists of five short strips of skin, the top one being wide and the others narrow and separated by welts.

Decoration on this container consists of appliquéd pieces of tanned sealskin (fig. 1). Unbleached pieces are used on the bleached strips and bleached pieces on the unbleached strips. Some of the decorative elements are sewn on with a running stitch, in several places with red thread rather than sinew although the color is hardly visible. Others are woven into strips in an over-under pattern. On some of the very narrow strips, decorative pieces, usually simple rectangles or squares, are simply held in place by the welts on either side. The lid is decorated in the same manner except that a very narrow strip of bleached skin around the rim is cut in a zigzag pattern and held in place by the sinew stitching (fig. 3).

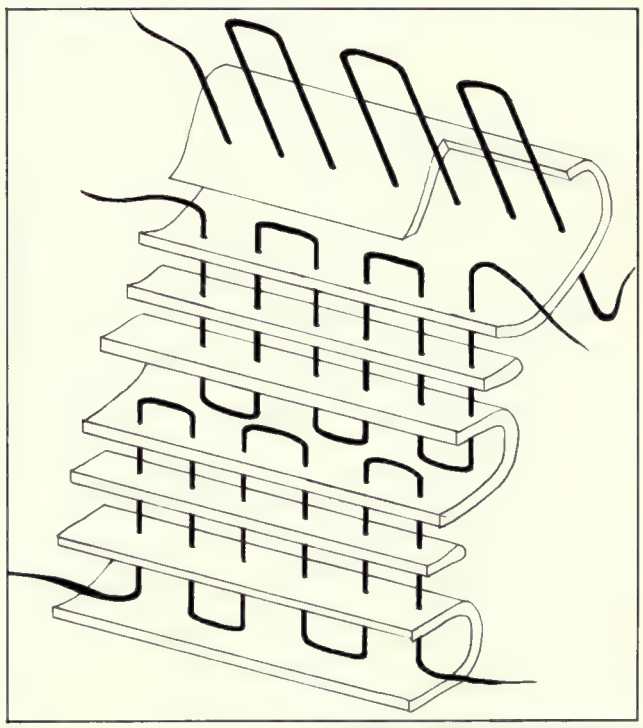


Fig. 2 DRAWING BY ZBIGNIEW JASTRZEBSKI N109057-A

The other two bags in this group are constructed in much the same manner and are approximately the same size. The first (catalog No. 27726, approx. 18cm high) consists of a flat bottom piece of unbleached skin and 28 alternating strips of bleached and unbleached skin with intervening welts of the same material (fig. 4). The lid is made of nine strips which shorten toward an ivory knob at the top. A recessed strip extending below the lid fits into the bag opening. Most of the decorative pieces are held in place by the welts, but a few are woven into the strips in an over-under pattern. All sewing is with sinew.

The third bag (catalog No. 27728, approx. 13.5cm

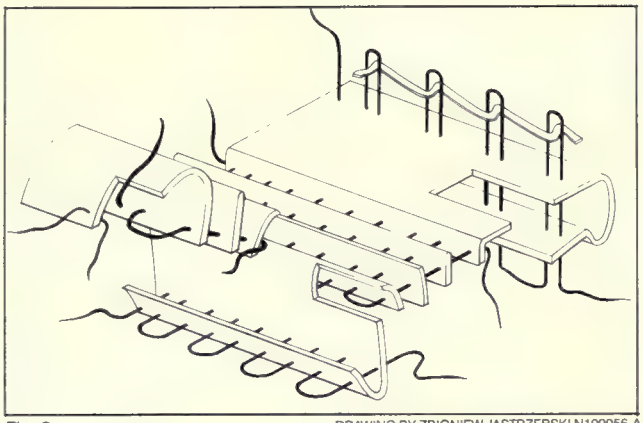


Fig. 3 DRAWING BY ZBIGNIEW JASTRZEBSKI N109056-A

high) has a flat bottom and is constructed of 24 narrow strips of skin separated by welts (fig. 5). A slightly flaring rim is a single piece of unbleached skin folded over at the edge and sewn with a running stitch. All sewing is with sinew. There is a broken carrying strap of unbleached skin. The nearly flat lid consists of two pieces separated by a welt, with a narrow loop of unbleached skin in the center. All appliquéd decoration on this container is held in place by the welts. There are also five beaded decorative elements, spot-stitched and sinew-sewn, at intervals on a wide unbleached strip just below the rim of this bag. The bead colors are pink, white, blue, and green.

Fig 4 PHOTO BY RON TESTA N108075

Fig. 5 PHOTO BY RON TESTA N108077

It is interesting to speculate on the provenience of the three bags in this group. The fact that they were collected at Nome does not provide any reliable clues as to where they were made and used. The village of Nome was established by gold miners in 1898 and quickly became an economic center for a large area of northwest Alaska, particularly following the discovery of gold on the beaches in front of the community in 1902. Native peoples from Alaskan settlements were attracted to Nome by opportunities to trade with gold miners and other visitors. Handicrafts from even more distant areas, including northeastern Siberia, reached Nome through native and nonnative trading patterns and routes.

The style of decoration on the bags described suggests that they were made either by Eskimos on St. Lawrence Island or the coast of Siberia, or by the Chukchi of coastal Siberia. In all three areas, the use of alternating light and dark tanned sealskin was characteristic, as were appliquéd designs similar to those on the Field Museum bags. It would not have been difficult for a collector at Nome to obtain examples of St. Lawrence Island or Siberian crafts either directly from native visitors or as a result of trade networks.

The fourth bag was collected by the Borden-Field Museum Alaska Arctic Expedition in 1927. It is identified in the catalog as a "woman's bag" and was obtained at Cape Prince of Wales on Seward Peninsula. Like the other three

containers, this one was probably also intended to hold sewing equipment, jewelry, or small household items.

This bag (catalog No. 177780, approx. 23cm high, excluding strap) has a flat bottom of tanned unbleached sealskin and sides that flare evenly toward a slightly constricted neck (fig. 6). It is constructed from 24 narrow strips of bleached skin with welts of the same material between every other strip (fig. 7). Two strips near the opening and the rim are of unbleached skin. Six of the strips and every other welt are dyed red. Additional decoration includes three vertical strands of light blue, dark blue, and translucent yellow beads, spot-stitched and thread-sewn, which are attached at intervals around the bag; and dangles of blue beads toward the center of the bag between the vertical strands. The bag has a loop carrying strap of bleached skin. Sewing throughout, with the exception of the beaded strands and dangles, is with sinew; the bottom piece is attached to the lowest strip by means of a whip stitch.

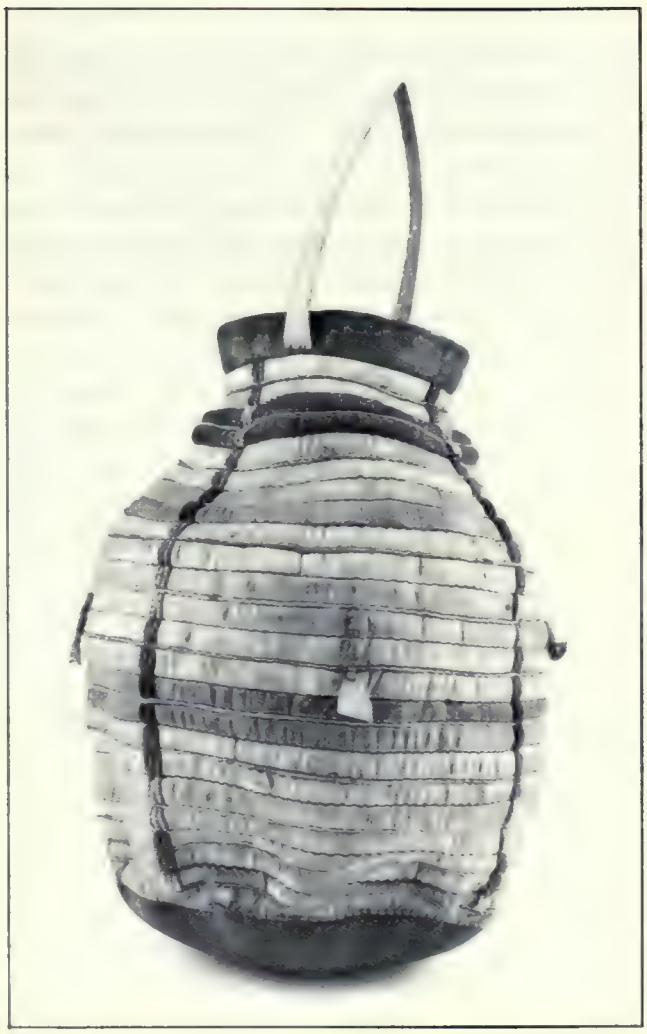


Fig. 6 PHOTO BY RON TESTA N108691

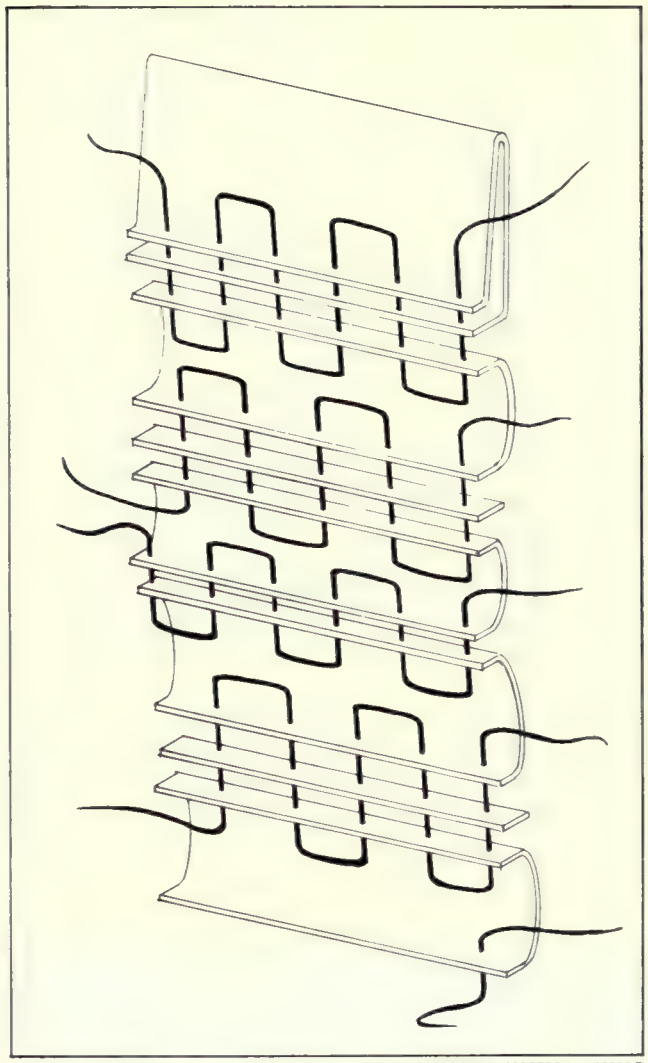


Fig. 7 DRAWING BY ZBIGNIEW JASTRZEBSKI N109056-B

Although all four bags are now stiff and inflexible, the strips of sealskin would have been soft and pliable when the containers were being sewn. After the strips and welts were sewn, the finished bag was turned inside out so that the sewing and untrimmed edges were on the inside. Thus, most of the appliquéd decoration had to be in place before the bag was turned.

Since the construction of the bags described here is perhaps unique, or at least extremely rare, it is difficult to draw any specific conclusions concerning the significance of these particular specimens. Although apparently rare as a bag-making technique, welting was used frequently by Eskimo women in the construction of footgear. Regardless of rarity, however, it would not be surprising to find bags of the same design on both sides of Bering Strait since handicrafts in the two areas were derived from a common heritage and a long period of cultural exchange. FM

TOURS FOR MEMBERS

Grand Canyon Adventure

May 25 - June 3

Many of us have beheld the Grand Canyon from the rim or while flying overhead, and some of us have hiked partway down to the Colorado River. But there is another Grand Canyon that relatively few have experienced: Field Museum is offering you the opportunity to see and experience the canyon from the river.

The 280-mile trip will be by two motorized rubber rafts. We'll sleep on sandy beaches under the stars and our meals will be excellent. Along the way, we'll hike to places of unusual geologic and anthropologic interest, sometimes through the most pleasant and enchanting stream beds and valleys, at times along the waterfalls. We'll see and study more geology in this one brief period than can be seen anywhere else in comparable time. Dr. Bertram Woodland, curator of petrology, will be our tour leader.

The trip will begin on Friday, May 25, with a flight to Las Vegas, where we will remain overnight. The evening of our arrival, we'll have a briefing about the river trip and will receive our river equipment. Saturday morning we'll leave by deluxe bus for Lees Ferry, where we'll board the rafts. The trip will end 9 days later, at Pierce Ferry, near the head of Lake Mead. We'll return to Chicago, via Las Vegas, Sunday, June 3.

You needn't be a "rough rider" to join this expedition—you needn't even know how to swim. Persons of any age can enjoy the river with equanimity, and come out proud and happy to have experienced this extraordinary adventure.

The cost (to be announced) per person covers all expenses (including air fare, board fees, waterproof bags for gear, sleeping bags, etc.), and all meals. The trip is limited to 25 participants.

Alaska Natural History Tour

June 1984
$4,185

Experience the Great Land. Descriptions of Alaska are filled with superlatives—a state more than twice the size of Texas with a population less than that of Denver, 33,000 miles of coastline, 119 million acres of forest, 14 of the highest peaks in the United States culminating in Mt. Denali (formerly Mt. McKinley), at 20,320 feet. Alaska is equally a land of wildlife superlatives, from her great herds of caribou to swarming seabird rookeries to surging salmon in migration. When one thinks of Alaska one thinks of wilderness, of nature still fresh and undomesticated, of experiences dreamed of but mostly unavailable to us of the lower 48.

Join us for an Alaskan odyssey through a wide range of habitats from the rockbound fur seal and sea bird colonies of the Pribilofs, to the dripping forest and calving glaciers of the southeast, to the grandeur of the Alaskan Range, to the Fjordlike quiet and beauty of the inland passage.

Our travels will be by plane, train, bus, boat, horseback, and foot—whatever best enhances our experience. Emphasis will be on the land, its history, its wildlife. Interpretation combined with direct observation will provide an enjoyment and quality of experience unavailable to the casual visitor. Whatever your interest in natural history—marine mammals, birding, mountains, photography, flowers, forests, glaciers, rivers—this tour will show you Alaska in all its diversity and splendor.

The tour will be led by Dr. Robert Karl Johnson, Chairman of the Department of Zoology of Field Museum.

For additional information on any tour, please call Tours Manager Dorothy Roder at 322-8862 or write Field Museum Tours, Roosevelt Road at Lake Shore Drive, Chicago, IL 60605.

Tropical Marine Biology

Exploration of Isla Roatan

February 15-24
$1,450

Crystal clear water, magnificent coral reefs, and a fantastic diversity of marine life are characteristics of the coast of Roatan, the largest of the Bay Islands in the Gulf of Honduras and some 30 miles off the Central American coast. Field Museum will conduct a 10-day tour to Roatan especially for divers that will combine superlative diving, expert instruction in marine natural history, and an opportunity to observe or actively participate in the scientific collecting of fishes.

An outstanding attraction for divers is spectacular "drop-offs" whose tops extend into depths as shallow as 25 feet. Leading the tour will be two ichthyologists with more than 10 years experience in the Caribbean as teachers, divers, and researchers: Dr. Robert Karl Johnson, curator of fishes and chairman of Field Museum's Department of Zoology; and Dr. David W. Greenfield, professor of biological sciences and associate dean of the Graduate School at Northern Illinois University. Illustrated talks about marine ecosystems will be combined with field trips to observe habitat types.

Accommodations will be at the Reef House diving resort on Roatan. The price of $1,450 covers all travel, lodging, and meals at the Reef House, and two or three tank dives per day.

Additional Tour Gems Slated for 1984

- China and Tibet
- Kenya
- Peru
- England's Old Inns, Old Homes, Old Castles, and Old Gardens. Please ask to be on our mailing list if any of these tours is of interest to you.

ISS MARITA MAXEY
411 N GREENVIEW
HICAGO IL 60626

YUEH LUNG SHADOW THEATRE

Sunday, February 5
Two Performances: 1:00pm and 2:30pm
James Simpson Theatre
Members: $3.00
Nonmembers: $5.00

FIELD MUSEUM OF NATURAL HISTORY BULLETIN

March 1984

"SHUTTLE DIPLOMACY: AIDING THE CRANES OF ASIA"

Lecture by George Archibald, March 24

ESKIMO ART & CULTURE LECTURE SERIES

"Inua: Spirit World of the Bering Sea Eskimos"

by William W. Fitzhugh, March 10

"The Elegance and Drama of Eskimo Art: Notable Achievements"

by Dorothy Jean Ray, March 17

CONTINUED FROM PAGE 3

Events

March Weekend Programs

Each Saturday and Sunday you are invited to explore the world of natural history at Field Museum. Free tours, demonstrations, and films related to ongoing exhibits are designed for families and adults. Check the *Weekend Passport* upon arrival for complete schedules and program locations. The programs are partially supported by a grant from the Illinois Arts Council.

March

10 12:00noon ***Continents Adrift.*** (lecture/demonstration) Why have fossils of similar dinosaur species been found on continents separated by vast oceans? The concept of "moving" continents is illustrated with enormous puzzle pieces.

1:30pm. ***Tibetan Borderland: Bhutan and Nepal.*** (slide lecture) Experience a Himalayan journey as you explore Bhutan, "Land of the Thunder Dragon," and important sites of Buddhism in Nepal.

11 12:30pm ***Museum Safari.*** (tour) Seek out shrunken heads from the Amazon, mummies from ancient Egypt, and big game from Africa.

17 2:30pm. ***Treasures From the Totem Forest.*** (tour) A walk through Museum exhibits introduces the Indians of southeast Alaska and British Columbia, whose totem poles and masks proclaim their pride of rank and mystical ties to animals and spirits.

18 2:30pm. ***Eskimo Art and Life.*** (tour) The hunters of the arctic fashion beautiful objects to honor spirits and the animals upon which their lives depend. This tour of our permanent Eskimo collection serves to heighten understanding of our current special exhibit "Eskimo Art & Culture."

24 1:30pm. ***Tibetan Borderlands: Ladakh.*** (slide lecture) Examine the religious ritual, folk music, and daily lives of the people of Ladakh, "Land of Many Passes."

3:00pm. ***China's Great Wall and the Silk Road.*** (slide lecture) Travel west, along the Great Wall and caravan roads, to China's ancient capitals. Follow the course of Chinese empires, arts, and faiths.

25 12:30pm. ***Museum Safari.*** (tour) Seek out shrunken heads from the Amazon, mummies from ancient Egypt, and big game from Africa.

2:00pm. ***Life in Ancient Egypt.*** (tour) Investigate the objects and practices, including mummification, which illustrate ancient life in the Nile Valley.

31 1:00pm. ***Traditional China.*** (tour) Examine the timeless imagery and superb craftsmanship represented by Chinese masterworks in our permanent collection.

These weekend programs free with Museum admission; tickets not required.

Registration

Please complete coupon for your program selection and any other special events. Complete all requested information on the application and include section number where appropriate. If your request is received less than one week before program, tickets will be held in your name at West Entrance box office until one-half hour before event. Please make checks payable to Field Museum. Tickets will be mailed on receipt of check. Refunds will be made only if program is sold out.

Program Title	Member Tickets #Requested	Nonmember Tickets #Requested	Total Tickets #Requested	Amount Enclosed
			Total	

Name

Street

City State Zip

Telephone Daytime Evening

Have you enclosed your self-addressed stamped envelope?

For Office Use:

Date Received **Date Returned**

Return complete ticket application with a self-addressed stamped envelope to:

Public Programs: Department of Education
Field Museum of Natural History
Roosevelt Road at Lake Shore Drive
Chicago, IL 60605-2497

FIELD BRIEFS

Ray A. Kroc

Ray A. Kroc
1902-1984

Ray A. Kroc, a generous donor to Field Museum, died on January 14 in San Diego, CA at the age of 81. Mr. Kroc had distinguished himself in the business world as founder of McDonald's Corporation, which he served as senior chairman of the board at the time of his death. He was also owner of the San Diego Padres baseball team.

In 1972 Mr. and Mrs. Kroc made a gift to Field Museum—one of several made in Chicago in observance of his seventieth birthday. The gift was to provide major funding for "Man in His Environment," a new hall opened in 1975 calling attention to man's effect on the biota.

Another gift followed in 1975 to establish the Joan and Ray Kroc Environmental Education Fund. A major thrust of the fund was to initiate an adult education program at Field Museum. (See pages 24-26.) It is of interest that from that small beginning has grown a broad-based adult course and field trip program that served 4,900 registrants in 1983. Further, the program is largely self-supporting. The growth and success of the adult segment of Field Museum's educational program is in keeping with Mr. Kroc's own entrepreneurial spirit.

Mr. and Mrs. Kroc's gifts to Field Museum totalled well over $1 million. They are among those generous donors who have helped to shape the Museum's course in the last quarter century. Ray Kroc's memory will be perpetuated in the Joan B. and Ray A. Kroc fund at Field Museum, which will ensure continued support of the Museum that he helped to build.

Ron Testa

Peter R. Crane

British Award for Peter Crane

Assistant Curator Peter R. Crane of the Department of Geology was honored in December by the British Palaeontological Association. At its annual meeting, the association awarded Crane the President's Prize for the best paper given by a research worker under the age of 30. Crane's presentation concerned his research on fossils of some of the earliest known flowering plants.

Crane joined the Field Museum staff in September 1982. His paleobotanical research is directed towards clarifying the evolution of flowering plants (angiosperms), which today dominate the world vegetation with more than a quarter of a million extant species. In particular, his studies have focused on the reproductive structure and biology of the earliest flowering plants, and the enigmas surrounding the origin and early diversification of the group. Later phases in angiosperm evolution are being examined through National Science Foundation-supported research on the early fossil history and evolution of selected flowering plant families.

President Boyd Honored

The Law School Admission Council presented awards in January to five law school graduates who have used their legal education in a variety of ways; among the five was Willard L. Boyd, president of Field Museum. The award was for "accomplishment and achievements as an inspiration to others at the threshold of a career choice." Boyd's outstanding accomplishments have been in higher education, the arts, and cultural institutions.

Boyd received his law degree from the University of Minnesota and LL.M. and S.J.D degrees from the University of Michigan. Before coming to Field Museum in 1981 he was at the University of Iowa since 1954, serving the university as president for his final twelve years there.

Willard L. Boyd

Terrell Promoted to Curator

John Terrell, who joined Field Museum's Department of Anthropology in September 1971, has been promoted from the rank of associate curator to that of full curator. A specialist in human biogeography and Pacific Islands archaeology and ethnology, Terrell's scholarly contributions focus on the study of human diversity and on innovating ways of explaining scientifically the peopling of the Pacific. In announcing this promotion, Lorin I. Nevling, Jr., director, noted also Terrell's instrumental role in bringing the first mainframe mini-computer to the Museum, his leadership of the Center for Advanced Studies during one of its most active priods, and his leadership also in the production of Field Museum's popular traveling exhibition "Patterns of Paradise."

Ron Testa

John Terrell

DANCING for the DEAD

by David M. Walsten

Their body dynamics and delightful expressions catch our attention as we stroll through the Hall of Ancient China. The style of these terra-cotta figurines bears an astonishing similarity to the uninhibited choreographics of our own contemporary youth. Yet, these pieces of inspired modelling were fashioned more than 1,000 years ago, during the Tang dynasty.

The function of the statuettes—averaging about 14 inches in height—was not to decorate the precincts of the living, but to provide perpetual entertainment for the dead, and we see them now much as their real-life counterparts must have appeared during the sumptuous festivals that accompanied the funerals of Tang gentry.

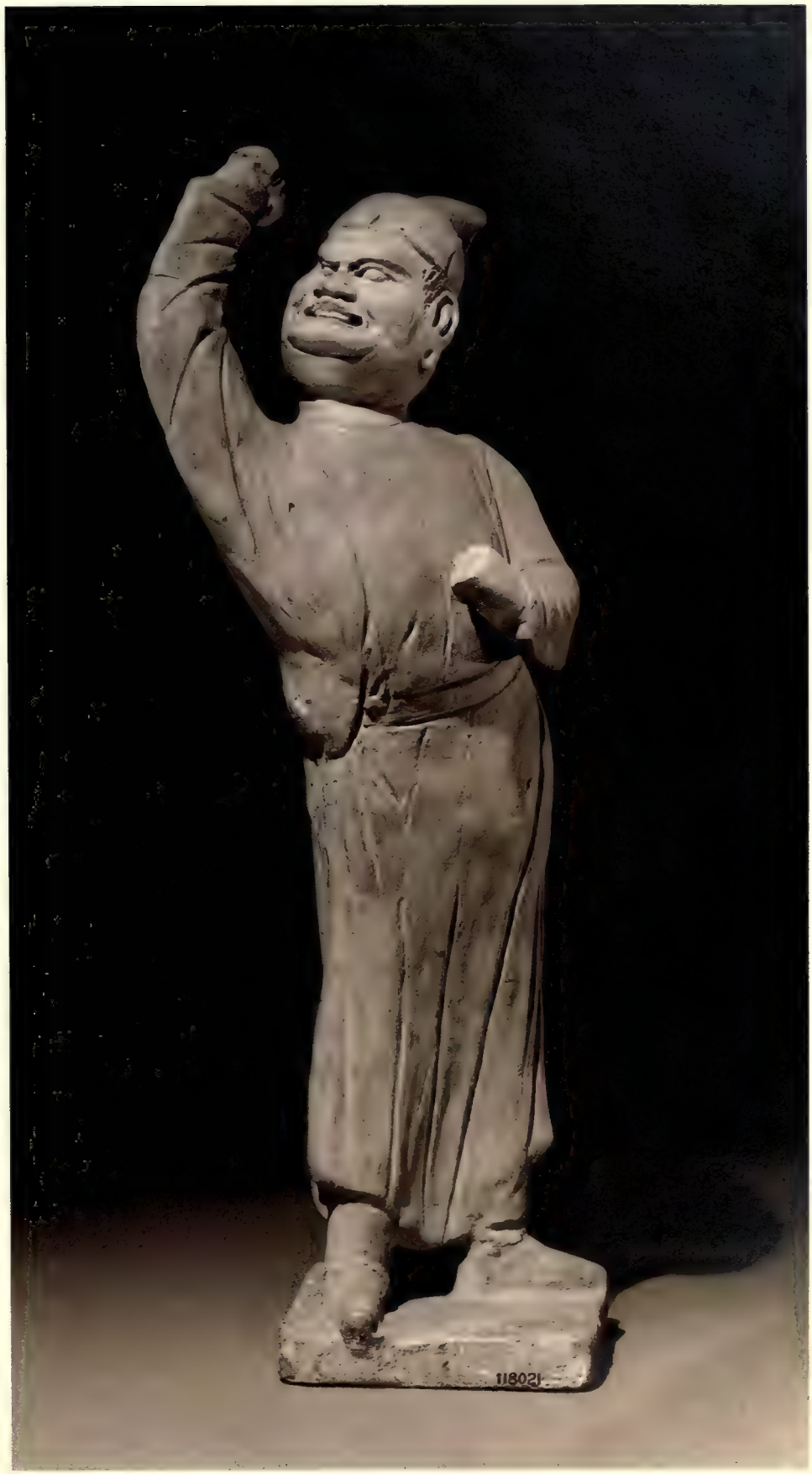
Through eternity, the mission of these effigies was to accommodate the spirit of the man or woman in whose tomb they had been placed. In addition to performers of assorted types (actors, mimes, singers, jugglers, tumblers, boxers), figures of soldiers and servants also were

Figurine of mime. Ht. 34.5 cm. Collected by Curator Berthold Laufer 1908-10. #118020. N98626.

placed in burial chambers, as well as those serving spiritual needs—exorcists, shamans, and sorcerers. But it is these performers, seemingly modelled from life, who project so effectively from their modern glass case.

Before the interring of effigies as attendants for the dead was generally practiced, humans were sacrificed for this purpose. As early as the Shang dynasty (16th-11th centuries B.C.), the fidelity of servants as well as wives was rewarded by permitting them to join their masters in eternity. The Duke of Qin, who died in 678 B.C., is reported to have invited 66 of his henchmen to accompany him as servants in the other world; it is improbable that his invitations were declined. In 588 B.C., real horses and real chariots as well as flesh-and-blood servants accompanied the Duke of Song into the tomb. As late as the Han dynasty, which ended (Eastern Han) in A.D. 220, the bodies of male and female servants were said to have been secured with nails to tomb walls —before or after death is not made clear.

Much earlier, however, during the time of Confucius (551-479 B.C.), crude effigies of straw had sometimes been buried with the dead. Confucius disapproved of more exact replicas, believing that faithful representation made it easy to lapse into the barbarism of human sacrifice. The custom of placing clay figures in tombs began in the Zhou, increased greatly in the Qin and Han, and reached a climax during the Tang (A.D.



Figurine of mime. Ht. 36.2 cm. Collected by Curator Berthold Laufer 1908-10. #118021. N98639.

618-907). By then, the sacrificing of humans had long since been discontinued.

The rank of the deceased, not unexpectedly, determined the number of human effigies to accompany him in the afterlife. An official above the fourth rank (a relatively high station), for example, could have a platoon of 90; above the sixth rank, 60 pieces; above the tenth rank, 40. Common folk had to be content with no more than 15, and the height of these could not exceed 8 inches. The higher one's rank, the taller his clay attendants, the maximum being life-size. Field Museum visitors who viewed the 1980 exhibit "The Great Bronze Age of China" will recall the spectacular life-size clay cavalrymen and horses that had been disinterred from the stadium-size excavations in the precincts of the tomb of the Emperor Qin Shihaungdi (221-210 B.C.).

If small, the clay figures were arranged in a niche made for the purpose in a wall of the tomb, or they were placed on shelves along the walls. If large, they were commonly stood on the tomb floor at the head of the coffin. The graves of the wealthy sometimes had a special anteroom entirely filled with clay images of animals as well as men. There were also models of utilitarian objects such as kitchen utensils, strong boxes, storage bins for grain, and even pig sties.

It is not known just when the placing of effigies in tombs was no longer "in," but the Emperor Dai Zi (A.D. 951-960),

Figurine of mime. Ht. 35.8 cm. Collected by Curator Berthold Laufer 1908-10. #118022. N98638.

who most certainly was aware of tomb depredations, ordered only his body and coffin occupy his. To make his tomb less attractive to thieves, he gave instructions that all the customary tomb furniture —statuettes of men, horses, and tigers as well as weapons—be left on the outside of the grave.

But not everyone followed Dai Zi's suit; graves as recent as the Ming dynasty (1368-1644) have yielded statuettes. Notable among these are the 66 polychrome glazed pottery figurines, representing an honor guard, that were recently on view as part of the exhibit "Treasures from the Shanghai Museum: 6,000 Years of Chinese Art," and featured on the cover of the January *Bulletin*. These pieces, it has been determined, were made sometime after 1516. FM

Below: *Dwarves, popular with Tang royalty, were also represented in tombs. This figurine is of a female dwarf. Ht. 10.9cm. #117949. N98643.* Right: *Figurine of mime. Ht. 33.6cm. #118023. N98627. These figurines were collected by Curator Berthold Laufer 1908-10.*

Fig 1. The massive ceiba tree. Widely cultivated in the American tropics, the ceiba was a prime symbol of the universe for the ancient inhabitants of Mexico and Central America. Photo by William Burger.

The Tree, the King and the Cosmos
Aspects of Tree Symbolism in Ancient Mesoamerica

by Alan L. Kolata
Research Associate, Department of Anthropology

Fine line drawings, except where noted, by Sara Scherberg

On November 8, 1519, a Spanish expeditionary force led by Hernan Cortés crossed over an ancient lake bed on a magnificent elevated causeway into Tenochtitlan, the great native capital of the Mexica, or Aztec nation. The Spanish were astonished by that splendid city's vast marketplace burgeoning with exotic commodities from throughout the Mexica realm, by its sumptuous, exuberantly ornamented palaces and temples, and by the broad, regular avenues and waterways that integrated the entire metropolitan zone. These adventurers found themselves submerged in an alien world where even the most fundamental natural, social, and religious notions of the structure of man's universe were radically different from those that the Europeans held certain and sacred.

In many respects, the Aztecs inhabited a cosmos with an architecture that, to the European, was inchoate and almost entirely incomprehensible. It is not surprising, then, that the Spanish, upon completing their political conquest, quickly embarked upon a systematic program of cultural conquest as well, dismantling the temples of the Aztec state religion and destroying the monumental art that visually embodied the "barbaric" cosmological doctrines which they perceived as subversive and threatening to the Christian world view.

Today, those of us who are products of modern industrial culture feel perhaps even more estranged from the ancient Mexica frame of reference than the Spanish. The Aztecs' philosophical and religious conceptions were born of and firmly rooted in a rich agrarian heritage and in a palpable sensitivity to the agricultural cycle of the seasons that to us is little more than a fading memory embedded in a nostalgic, rural mystique. We can spontaneously appreciate the monumentality and vigor of Aztec art, but in order to truly understand the nature and meaning of that art, together with the social information it conveyed, we must learn to perceive it in its own terms: as the product of an ancient, persevering cultural landscape of which the technology, sociology, and ritual of farming was the pivot.

Analyzing the symbolism encoded in the iconography of Aztec art furnishes us with a touchstone for comprehending the multiple and even more ancient cultural and artistic streams that together make up a general Pre-Columbian Mesoamerican tradition. For the Aztec period alone are we provided with an abundance of literary and pictorial documents (first-hand descriptions of indigenous cultures by Europeans and native codices, or screenfolds) that elaborate and comment upon the meaning of native Mexican religion, ritual, and custom. In attempting to grasp the fundamental meaning of ancient Mesoamerican art, our point of departure then is this final and most accessible period of Pre-Columbian cultural expression.

One of the primary notions concerning the spatial structure of the cosmos held by the Mexica (and, as we shall see, by other Mesoamerican peoples as well) was a heirarchical arrangement in which the earth was seen as a vast, thin disc floating in the primeval ocean. Growing through the center of the earth-disc was a giant tree, the roots of which ran deep into the surrounding sea while its uppermost branches reached the highest layers of the heavens. This cosmic tree was the *axis mundi*, supporting and defining both the vertical and horizontal framework of the multilayered universe.

A particularly graphic representation of this cosmic view appears on a beautiful Mexica ceremonial mosaic

Portions of this article are excerpted from Dr. Kolata's forthcoming monograph, Tree Symbolism in Ancient Mesoamerica. *Research for this work was conducted while the author was a senior fellow at Dumbarton Oaks Research Library of Harvard University in Washington, D.C.*

shield housed in the collections of the British Museum (fig. 2). The iconography of this shield has been decoded recently in some detail by the art historian Richard Townsend.*

In brief, the circular shape of the shield itself would have immediately evoked in the viewer the image of the earth-disc. Portrayed in wonderfully compressed fashion on the surface of the shield are images of the celestial and infernal realms, connected by a giant flowering tree. The heavens are represented by the disc of the sun with red coral rays pointing to the cardinal directions, by the four ritually attired sky-bearers with arms held aloft and, at the summit of the cosmos, by the flowering branches of the tree. The underworld is represented by an immense chthonic serpent rising from the base of the cosmic tree and looping around its trunk to the heavens. Townsend suggests that the four toothlike elements pendant from the lower body of the serpent represent an abbreviated Tlaltecuhtli mouthmask, symbolic both of the earth and of the entrance to the underworld. Finally, at the base of the shield is a downward projecting bifid element that Townsend believes is a serpent's tongue, but that I believe may also represent the roots of the cosmic tree sunk in the underworld abyss.

This whole ensemble of images on the surface of the shield was meant to be conceptualized spatially as the vertical component of a three-dimensional array (that is, rotated 90 degrees to form an axis through the center of the shield). Viewed in this way, the shield becomes a remarkably compact, yet complex rendering of the tree as cosmogram.

We know that shields as splendid as this were designed expressly for the most exalted rulers of the Mexica nation who used them for display on occasions of state ceremony. Frequently the mosaic designs on these shields were emblematic of both the individual and his office. In wearing the shield with the world-tree cosmogram, a Mexica lord was making an implicit comparison between himself as the ruler of his nation and the great tree as the ordering principle of the cosmos. The political message of the shield is clear: the king is to the state as the great tree is to the cosmos. Both provide order, one to the political chaos of earth, the other to the physical chaos of the universe.

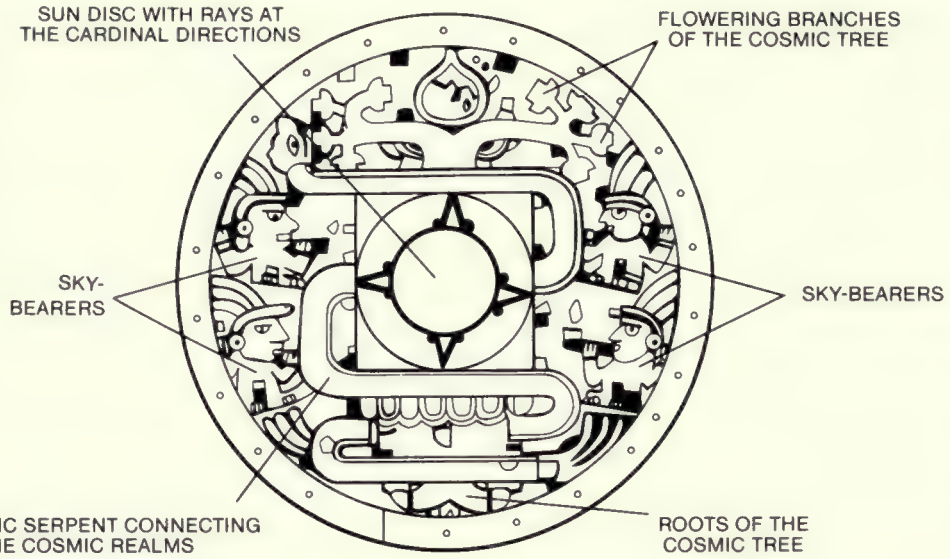


Fig. 2. The image of the sacred tree as cosmogram rendered in a brilliant turquoise and shell mosaic on the surface of an Aztec ceremonial shield. Once the property of an important Aztec dignitary, this shield is now housed in the collections of the British Museum.

This important metaphorical association of kings and trees is confirmed and extended by traditional Nahuatl (the Aztec language) discourses that were delivered on the occasion of important events in the lives of the Mexica royal household. These discourses were preserved and recorded in the original by the Spanish clerics Duran and, more importantly, Sahagun.

One such discourse was made by Nezahualcoytl, king of Texcoco, to the Mexica king Moctezuma the Elder upon the latter's accession to the throne of Tenochtitlan in 1440:

> I have come here, O Lord, to tell you of the misery, the affliction that reigns in your province of Texcoco. In your greatness deign to lift it and enable it and shelter it from other nations. You well know, great prince, that all your vassals, nobles as well as common people are under your

*Townsend, Richard F. 1979. *State and Cosmos in the Art of Tenochtitlan.* Studies in Pre-Columbian Art and Archaeology, *No. 20. Dumbarton Oaks, Trustees for Harvard University, Washington, D.C.*

shade and you have been planted here like a great cedar under which men wish to rest.[1]

Another discourse, likewise addressed to a new monarch upon his installation, again compares the ruler metaphorically to a great tree and further charges him with the care of his subjects:

> May thou perform thy office, may thou do thy work. Be diligent with that which is heavy, the burden, the unconfrontable, the insupportable. And extend thy wings, thy tail feathers. May thy common folk those whom thou governest, enter into thee. May they enter into thy shade, into thy shadow, for our lord hath made thee to be the great, the circular shade, the silk cotton tree,[2] the cypress. May the governed be rich, be prosperous.[3]

This passage stresses that the ruler must be prepared to bear an almost unsupportable burden. The nature of that burden is clarified in a second formal admonition to the new ruler:

> THOU HAST UNDERTAKEN TO SHOULDER A BUNDLE OF PEOPLE, A CARRYING-FRAME LOAD OF PEOPLE.
> This saying was said of him who had been installed as ruler or set up as a lord. Thus he was told: "Thou has undertaken to shoulder a bundle of people, a carrying frame load of people. Thou wilt find heavy, thou wilt find tiring the common folk, for great is the burden which thou has shouldered, which thou has undertaken.[4]

Taken together, these passages define the primary duty of the Mexica king: the protection, care and nurturing of the governed. Metaphorically, they describe the king who has successfully discharged this office as a great ceiba tree and as a carrying frame of the common people. These passages state clearly that there is a symbolic identity between the king who supports his subjects and the great tree that supports the unimaginable burden of the cosmos, the central world tree that was most often conceptualized as a ceiba. Just as that great tree, to avoid physical chaos in the universe, must not fail in its task as the carrying frame of the cosmos, so too the king must not fail to support his subjects if he is to avoid political chaos in the state (and, by implication, precipitous loss of his office).

Other Nahuatl adages extend the metaphor of the king as world tree in an important direction. Among the Mexica not only was the ruler seen as the framework and core of the state, providing political protection for his subjects, but also, quite literally, as the provider of daily sustenance for the common people:

> (The silk cotton tree) shades, it gives shadow, it shades one. Hence, for this reason, it is called the "governor," for he becomes as a silk cotton tree, a cypress. It bears fruit, it produces fruit.[5]

Some passages directly compare the ruler and his family to the plants that sustained the common people: "the maguey, the nopal, the (fruit) trees."[6] During the Feast of Tlaloc, the king impersonating the "god" Tlaloc, personification of the life-giving rains, is described as,

> that which fresheneth, that which is tender, that which sprouteth, that which blossometh; the plants, those which come from thee; thy flesh, thy freshness ... the nourishment whereby the world remaineth alive, ... the sustenance.[7]

What these proverbs, adages, and discourses are referring to in metaphoric fashion is the role of the Mexica king as the ultimate guarantor of agricultural success. One of the primary cult obligations of the royal household was to perform a continuing, seasonally regulated set of agricultural rituals that were, in effect, increase ceremonies for food crops, especially maize. The feast of Tlacaxipehualiztli (the "Skinning of Men") and the aforementioned Feast of Tlaloc, for example, were presided over by rulers of the Mexica nation and were explicitly conducted for the purpose of securing agricultural fertility. The rituals of these feasts express all of the metaphorical associations of kings, trees, and agricultural fertility discussed here: blood sacrifices for agricultural success were made by the "chief dignitaries and sovereigns" to "Tota, 'Our Father,'" whose image was represented by a huge tree specially erected for the ceremony.[8]

Returning to our mosaic shield for a moment, the carefully depicted flowering branches of the cosmic tree towering above the brilliantly colored disc of the sun evoke this same extended metaphor. In this aspect, the cosmic tree on the shield is seen as the tree of life with its roots drawing water from the primeval ocean to nourish and sustain the cosmos. Therefore, when worn by one of the lords of Tenochtitlan, to the political message of the shield (the king, like the cosmic tree, gives order and stability) can be added the economic message that, like the

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1. *Duran, Fray Diego. 1971.* Book of the Gods and Rites and the Ancient Calendar. *Translated by Fernando Horcasitas and Doris Heyden, 88. Norman: University of Oklahoma Press.*

2. *The silk cotton tree is a ceiba* (C. pentandra).

3. *Sahagun, Fray Bernardino de. 1951-70.* Florentine Codex: General History of the Things of New Spain. *Translated by Arthur J. O. Anderson and Charles Dibble, Book 6:58. Monographs of The School of American Research, The School of American Research and the University of Utah, Santa Fe.*

4. *Sahagun 1951-70, Book 6:258*

5. *Sahagun 1951-70, Book 11:109*

6. *Sahagun 1951-70, Book 6:91*

7. *Sahagun 1951-70, Book 6:36*

8. *Duran 1971:161 and plate 14*

tree of life, the king nourishes and sustains the common people: through direct intercession and indentity with the divine forces of nature he will guarantee agricultural success for the nation.

It is clear, even from so brief an overview, that there was among the peoples of the Valley of Mexico in Pre-Hispanic times a metaphorical association of rulers and trees, one most specifically expressed in terms of a symbolic identity between the king and the world tree. Two trees in particular, the ceiba (*pochotl*) and the cypress (*aueuetl*), were explicitly referred to as "father, mother, lord, capitan, or governor." Conversely the Mexica kings and great magnates were ritually described and addressed as the ceiba that towers above all else. According to Duran,[9] the sovereign of the city-state Amecameca even took the name Cuauhteotl, "Divine Tree."

By adopting a symbolic association with trees, and more specifically with the world tree/tree of life, these sovereigns were claiming a ritual identity with the ordering principle of the cosmos, the principle that nourishes and sustains all life. The Mexica kings were consciously using the generally acknowledged image of the tree as cosmogram as an emblem of their right to rule. The tangible interplay between religious symbolism and secular politics could not be more clear.

Was this particular set of cosmological symbols an invention of the Aztec state, or can we trace its roots even deeper in other Mesoamerican political and cultural traditions? I believe that we can, in fact, discern the same conceptual association of rulers, trees, and agricultural rites of intercession in other places, at other times, and among other peoples in Mesoamerica. I would argue that this association was a recurring central metaphor in the ideological structure of Mesoamerican civilization, and therefore a principal leitmotiv of public art commissioned by royal households to commemorate their government. Although in this brief essay it is not practical to document the entire range of occurrence of this symbolic set, or the various political, social, and ideological meanings with which it was imbued, a few well-chosen examples of the same ruler-tree-agricultural ritual association from non-Aztec Mesoamerica will serve to clarify and emphasize the pervasive nature of this concept which, in the native mind, intimately bound the world of nature with the social order.

An extraordinary rendering of this symbolic set appears in one of the precious native-style manuscripts, or codices, that remain to us from Pre-Hispanic times (the

9. *Duran 1971:97*

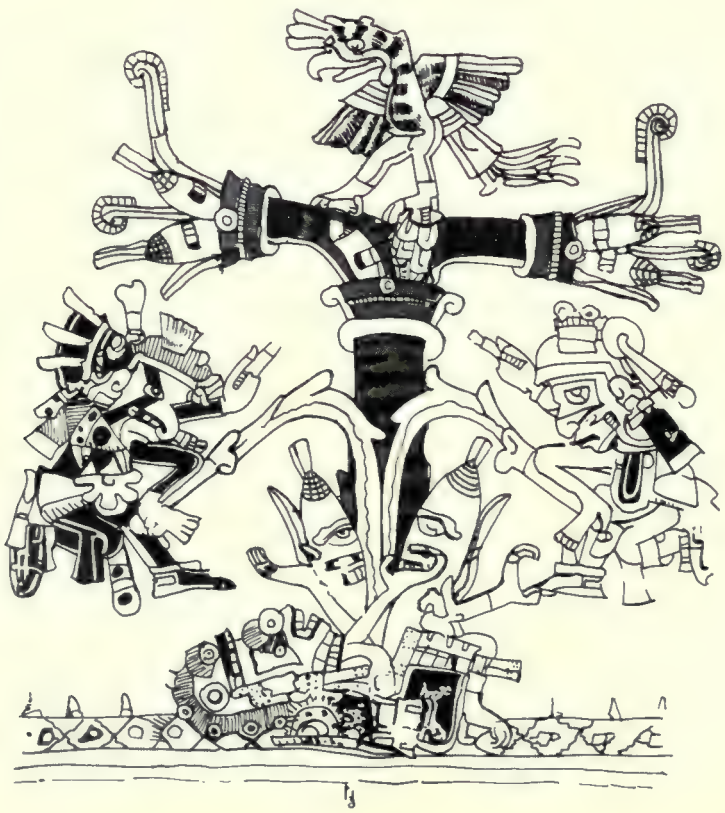


Fig. 3. Simplified drawing of the image on page 53 of the Borgia Codex, a native-style manuscript from the Mixtec region of western Mexico

folded pages of these manuscripts were usually strips of deer hide that were cut to size, sewed together, coated with gesso, and painted in multiple colors). The image in question was painted on what scholars have designated as page 53 of the Borgia Codex (fig. 3). This manuscript comes to us from the Mexican state of Oaxaca, center of the ancient Mixtec region. Here elaborately dressed rulers, apparently personifying deities of natural forces, are engaged in automutilation, drawing blood from their own bodies with sharp bone awls in order to fertilize the roots of a great tree from which spring enormous, marvelously exaggerated cobs of corn. This tree, emerging from the belly of a skeletal figure reclining on the plane of the earth's surface, graphically evokes a sense of agricultural fertility: it is the archetype of vegetal abundance, the Tree of Life. The profound role of the ruler in assuring the continuing regeneration and vigor of this tree of life, which was emblematic of the agricultural abundance that sustained the common folk, is portrayed with uncommon frankness. The monarch must sacrifice some of his own life-giving blood to ritually nourish the earth and thereby coax from it a bountiful harvest for his people.

The truly intimate symbolic connections between rulers and trees finds its ultimate expression in an ancient tradition from this same Mixtec region which relates that the old Pre-Hispanic kings and their ruling lineages were originally born from trees growing in the Mixtec highlands. A Mixtec origin myth recorded during early Spanish Colonial times explicitly states that the Mixtec people emerged from the center of the earth, but that the Mixtec kings and gods were born from trees. The anthropologist Jill Furst* has documented many vivid visual representations of this oral myth in Mixtec manuscripts. Frequently in these manuscripts a royal couple, attended by two elaborately garbed deities, is portrayed emerging from a cleft in the swollen trunk of a tree (fig. 4). In some illustrations of tree birth, the emergent royal figure is still attached to

*Furst, Jill Leslie. 1977. *The Tree Birth Tradition in the Mixteca, Mexico.* Journal of Latin American Lore *3:2, 183-226.*

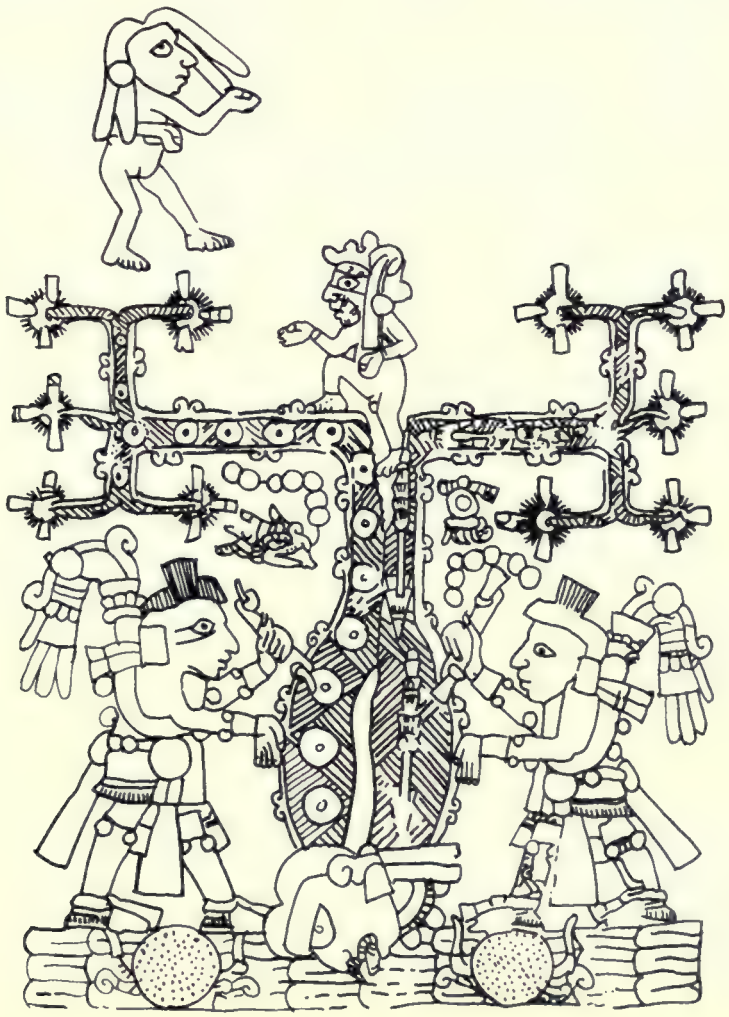


Fig. 4. The birth of a royal couple from a sacred tree as portrayed on page 37b of the Vienna Codex, a Pre-Hispanic manuscript from the Mixtec region

the sacred tree by a kind of umbilical cord (fig. 5). The birth of an entire royal lineage from a lush tree appears in startling detail on the intricately carved surface of a bone discovered in an elite tomb at the ruins of Monte Alban, the ancient paramount city of the Mixtec region (fig. 6). This remarkable carving not only confirms the presumptive antiquity of the tree birth myth, but further gives richer meaning to the term "genealogical tree."

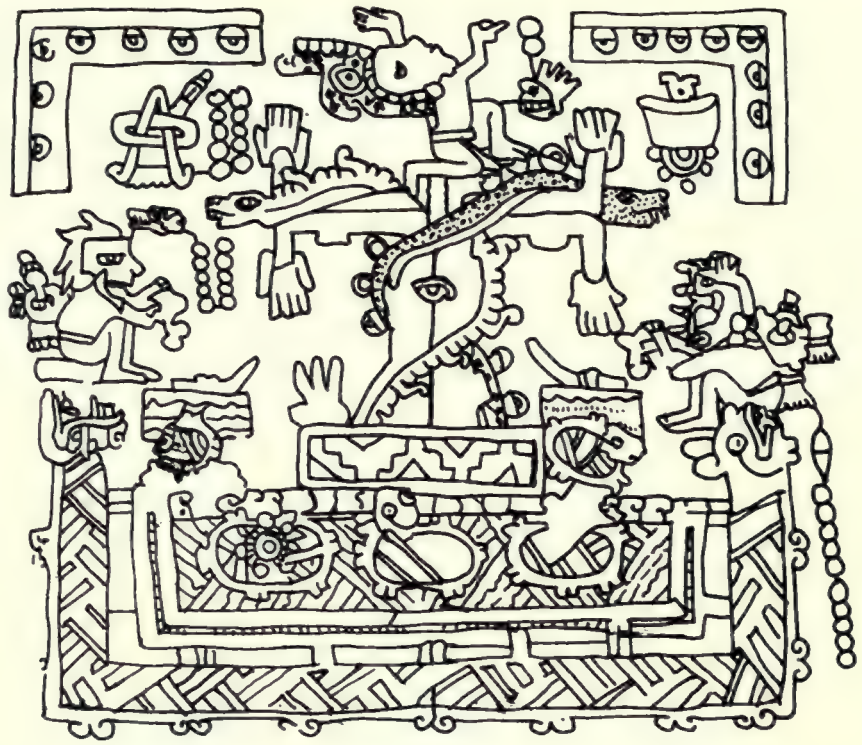


Fig. 5. An elaborately masked male, identified by his calendrical name as "2 Grass Skull," emerges from the crown of a magical tree entwined with serpents. Note the umbilical cord which still connects "2 Grass Skull" to the tree of his birth. Page 2-I of the Selden Codex.

In death, as in birth, the image of the cosmic tree, as *axis mundi* and as tree of life, remained an emblem of central importance to the Pre-Hispanic kings of Mesoamerica. At the Classic Maya site of Palenque in Yucatan, there is a tomb hidden deep within an elegant pyramidal structure called the Temple of the Inscriptions. Within that tomb lies a massive stone sarcophagus which holds the remains of a Mayan king named Pacal, who died in the seventh century A.D. The lid of Pacal's sarcophagus is carved elaborately with heiroglyphic texts along the border and with the image of the dead Pacal himself, seated on a throne within the jaws of the mythical chthonic serpent, symbol of the earth and the underworld (fig. 9) Rising behind Pacal (or perhaps emerging from his body) is a stunning rendering of a tree surmounted by a fantastic masked bird, most likely a *quetzal* or eagle, symbolically associated with the celestial realm. The entire ensemble of images on the sarcophagus strongly suggests that the intended message of the sculpture was to exemplify the elevation of the dead king to divine status, and that this apotheosis of Pacal was to be visually expressed and confirmed by identifying the king with the world tree.

Although the sarcophagus of Pacal is perhaps the most striking example, other key commemorative monu-

Fig. 6. The birth of a royal lineage from a sacred tree as carved on the surface of a bone discovered in tomb 7 at the ancient ritual center of Monte Alban in the Mexican state of Oaxaca. The first of seven figures is attached to the tree by an umbilical cord

ments at Palenque, placed within temple precincts, ritually associate sacred images of the world tree/tree of life with the secular status, power, authority, and obligations of these regional Maya rulers. Like the Axtec nobility, then, the Maya kings used the image of the cosmic tree as an emblem legitimizing their right to rule.

Even in the centuries before Christ, we can identify this seemingly obsessive concern of native Mesoamerican rulers to ritually associate themselves with prominent and visually impressive images of trees as cosmograms and as symbols of agricultural abundance. The corpus of art referred to as the Izapa style, consisting most notably of carved stone sculptures and stelae from the Pacific coastal regions of Guatemala and the Mexican state of Chiapas, contains multiple and repeated images of trees, many of which are clear iconic references to our two primary symbolic manifestations: the world tree and the tree of life.

One sculpture at the site of Izapa itself, Stela 25, dating between about 300 B.C. to A.D. 250, combines all of the convergent metaphorical associations of kings and trees that we have seen embodied in the Aztec shield. The design on this stela illustrates the two interrelated symbolic representations of the sacred tree: in its aspect as the *axis mundi* or world tree, and in its aspect as the archetype of vegetal abundance or tree of life (fig. 7). At the left is the image of fertility and abundance, an upended cayman whose vertically oriented body becomes the trunk of a tree, while its tail is transformed into the luxuriant branches and leaves of the tree's crown. A small bird with plumed head perches on this cayman-tree, and a conch shell is placed behind the snout of the cayman. The conch shell associates the cayman-tree with the underworld and the watered earth, while the bird associates it with the heavens—both essential elements in the symbolic representation of the tree of life. On the right side of the design field is an image of the world-tree as a pillar, or more precisely a staff with three crosspieces, probably intended as a symbol of the multilayered universe. A human figure, clearly of elite status, and, significantly enough, adorned with a headdress of sprouting vegetation, holds the staff which emerges from a globular vessel. Surmounting this tree-as-staff is a spectacular masked bird which gazes toward its counterpart on the cayman-tree. To complete and interweave the two images, a snake winds down from the crosspieces of the staff, loops around the body of the cayman-tree and hangs freely with its head at the base of the staff-tree.

Viewed in this way, Stela 25 becomes a sculptural statement by the sovereign at Izapa who commissioned it

Fig. 7. Stela 25 from the site of Izapa. Drawing by Genaro Barr.

that reads: "this place is sacred because it is the center of the universe; my staff is the symbol of the center and I am its ruler. Because I am its ruler, I can provide for the sustenance of my people." This is the exact statement made by the kings of Tenochtitlan some 1,500 years later when on state occasions they mounted the great temples of the capital, resplendent in their royal garments and armed with ritual shields displaying the emblem of the world-tree.

How can we account for the remarkable continuity and coherence of this conceptual association of rulers–trees–agricultural ritual over wide expanses of space, time, and cultural tradition? The choice of the tree as the central symbol of this association is neither fortuitous nor particularly surprising. Trees, by their very nature, are impressive features of the natural landscape. Trees like the ceiba possess towering size, strength, and longevity; they have substantial root systems that reach deep into the earth and magnificent crowns that seem to form a canopy against the sky. What better symbol could there be for the metaphor of the *axis mundi*, the pillar that sustains the universe? These natural and symbolic qualities of trees were of prime interest to the sovereigns of ancient Mesoamerica who wished to ritually appropriate and publicly identify themselves with these same qualities.

But, for these native kings and ruling households, there was an even more compelling reason to seize upon the tree as an emblem of legitimate power. The states that these elite classes governed were economically dependent upon systems of intensive agriculture. Often the fate of central government in these preindustrial states was linked to its agricultural success. Accordingly, the ruling households of these states invested heavily in the construction and maintenance of large-scale reclamation projects designed to intensify agricultural production. However, building and sustaining these agricultural systems was not simply an economic proposition, requiring merely appropriate technology and a coordinated labor force. In the Mesoamerican worldview, to ensure agricultural success and thereby economic survival, these food producing systems had to be *ritually* sanctioned and maintained at key intervals in the agricultural calendar as well.

It is precisely here that the metaphor of the king as the cosmic tree reveals its full symbolic force. The yearly transformational cycle of trees, lying dormant in the winter (or dry season), surging to life in the spring (or onset of the rainy season), and gradually returning to dormancy in the fall, shedding their leaves, seeds, and fruits, closely mimics the agricultural cycle of the seasons exploited by man (the fields lie fallow, they are prepared and planted; the plants flourish and mature and finally they are gathered in the autumn harvest).

By identifying themselves metaphorically with the natural qualities of trees, these kings of ancient Mesoamerica, who were charged with the obligation of ensuring the agricultural success of their nations, were ritually assuring the people they governed that, like the perpetual yearly regeneration of the great trees of nature, the vast fields of the realm would not fail to produce an abundant harvest. In this way, the world tree/tree of life became an emblem of both political authority and economic prosperity: the king was at the center, governing and sustaining the state. But most importantly, through ritual intercession, he continually guaranteed the agricultural health of his nation.

To the mind of the ancient Mesoamerican, then, the tree and the cosmos, the king and the nation were metaphorically one. Their qualities were merged and their functions identical: they were simply different reflections of the same order that was expressed in both the natural and social worlds. It is by understanding the fundamental principle of the unity of these worlds that underlies the religious philosophy of ancient Mesoamerica, a principle anchored firmly in the bedrock of agrarian tradition, that we can seek to reconstruct the worldview of peoples now lost to us. FM

Fig. 8. The great trunk and crown of the ceiba tree silhouetted against the evening sky. The ancient rulers of Mesoamerica ritually and symbolically appropriated the impressive natural qualities of this tree, employing it as an emblem of their authority. Photo by William Burger.

Fig. 9. The sarcophagus cover of the Maya king "Pacal," who ruled from the city of Palenque in the seventh century A D. *Photo by Merle Greene Robertson and Lee Hocker. Courtesy Princeton University Press, which published the photo in* The Sculpture of Palenque, Vol. I: The Temple of the Inscriptions *(1983).*

CRANES

Common cranes over the Himalayas

These awesome giants of the bird kingdom are being aided by the International Crane Foundation in their struggle to survive

by George Archibald

photos courtesy the International Crane Foundation

Try to imagine that you are nearing the summit of Mount Everest, oxygen mask intact, layers of insulation protecting you from the intense cold. Suddenly you hear trumpetlike noises overhead. Gazing up, you see a V formation of large, dazzling white birds with black necks and flight feathers. Cranes! They must be flying at over 30,000 feet above sea level, over the formidable Himalayas.

At dawn, these common cranes might have been nesting in the shallows of a Tibetan lake. As mid-morning sunshine bathed the plains, columns of rising warm air, or thermals, began to form. Using them to gain altitude, the cranes began the last stage of their long migration from the Siberian tundra to the Gangetic plain of India. With their wings fixed, the cranes spiralled up in loosely organized groups, effortlessly riding the thermals to breathtaking altitudes. High above the Tibetan plateau, they formed broad V's and began a fixed-wing glide to the south. They gradually lost altitude, covering scores of miles in a shallow

George Archibald was a cofounder and is a director of the International Crane Foundation, Baraboo, Wisconsin.

dive. When they had descended to a few hundred feet above land, they began their first flapping flight. Their great eight-foot wingspans thrust them forward, until they found another thermal to carry them up for yet another gliding advance.

Soon the great Himalayan peaks were beneath them. The bright reflection from the snow reflected back off their light-gray body feathers, making them appear blinding white from below. By late afternoon the peaks were behind them, and the flock was over green foothills. Finally, the lakes and rivers of the northern Gangetic plain came into view. Parachuting downward, they alighted in the shallows of a broad wetland, and began a welcomed refueling. The cranes had returned to a landscape visited by some older birds for decades—a home to the ancestors of this flock for millions of years. When cranes pass overhead, people below realize a new season has come. From Tibet to India and beyond, cranes are considered auspicious birds. Good fortune rides on the sweeping strength of their wings. Their graceful postures, fidelity to mates, size, and wildness have endeared the crane to Cro-Magnon cave painters as well as to modern man.

How, then, is it possible that half of the world's fifteen crane species are now endangered? The wetlands on which the cranes nest and rear their young have been drained — destroyed to produce more farmland. Cranes have been hunted for food and sport. Egg collectors took a toll in the early decades of this century. By 1941 the whooping cranes of North America were reduced to 14 individuals.

A decade ago a nonprofit organization called the International Crane Foundation (ICF) was established near Baraboo, Wisconsin, with the sole aim of helping the cranes. Two graduate students from Cornell University, George Archibald and Ronald Sauey, were cofounders. Mr. Sauey's parents, Norman and Claire Sauey, donated the use of their farm as headquarters for ICF's captive breeding center. Baraboo became ICF's thermal — a place to gain altitude and fly.

ICF has had an eventful 10-year history. Zoos and governments sent rare cranes to ICF. With careful management, pairs formed and started to breed—several species for the first time in captivity. Today, ICF owns a place of its own, supports a staff of 10 and a collection of 78 cranes of 14 species, and has a membership of several thousand enthusiastic supporters.

ICF's most noteworthy achievements, however, have not been in aviculture or public education programs head-

"Shuttle Diplomacy: Aiding the Cranes of Asia"

Dr. George Archibald, director

International Crane Foundation,

will deliver this lecture on Saturday, March 24, 2:00 pm, in James Simpson Theatre. Members $3.00; nonmembers $5.00. Tickets may be ordered with coupon on page 4. This lecture is supported in part by the Ray A. Kroc Environmental Fund.

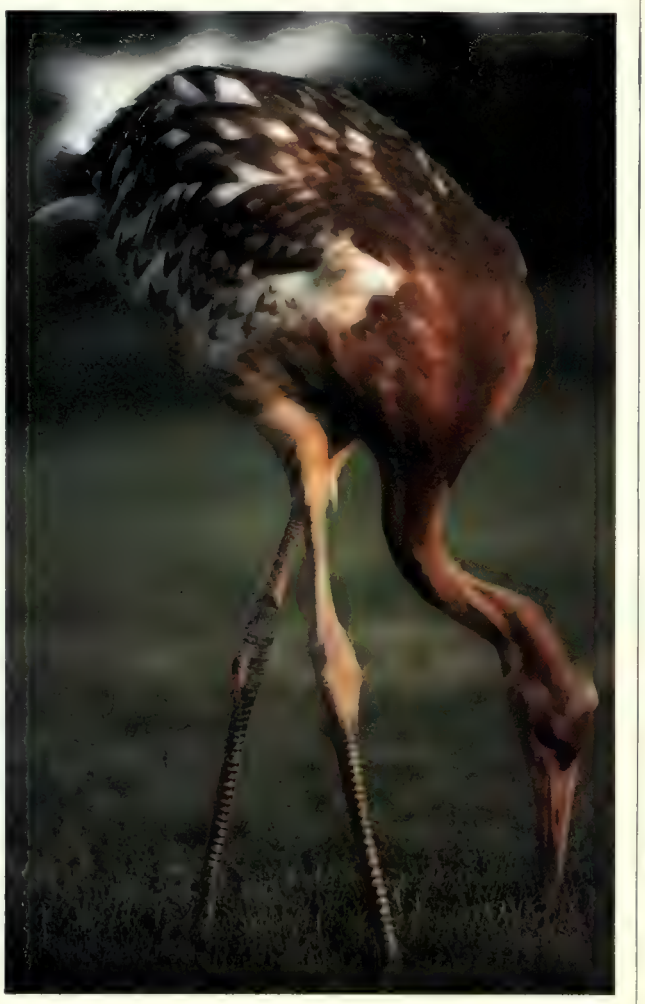
Red-crowned crane, adult

quartered in the Midwest, but in promoting crane conservation overseas. Cranes are found in North America, Eurasia, Africa, and Australia. ICF's cofounders have been busy in a spectrum of nations on these continents. For example, it is ICF which conveys ornithological news between China and the USSR. Despite recent political traumas in Iran, ICF still keeps in close contact with colleagues there. Cranes are a common interest — a bond across borders.

For example, ICF is now involved in a long-term, ambitious attempt to establish a new and more secure flock of Siberian cranes in west Asia. There are fewer than 300 of these snow-white cranes alive. In winter they feed on plant tubers found in shallow wetlands in Iran, India, and China. These wetlands are as endangered as the cranes. If the last habitats are lost to development, the cranes will probably starve.

But on the vast uplands of those same countries, common cranes feed on abundant agricultural wastes. Because of their adaptability, they number in the tens of thousands. If Siberian cranes could learn to feed with the common cranes, their wintering range could expand enormously. Foraging behavior is learned in cranes. Crane chicks stay with their parents for ten months, and are often offered food by the adults. ICF wants to capitalize on this aspect of crane behavior through a cooperative venture with the USSR. Siberian crane eggs, produced in captivity at ICF and sister centers, are being substituted into the nests of wild common cranes in the boreal forests of the USSR. The common cranes will raise the Siberian chicks, lead them on their migration route, and teach them to feed in agricultural fields on the wintering grounds. Through restocking programs of this kind, a captive-breeding program can restore crane populations in the wild.

In an era when war could destroy life on earth as it is known, it is critical that men from divided camps cooperate on projects of mutual interest. Cranes have proven to be a vehicle for such cooperation. As we help these mysterious, majestic birds continue their pilgrimages over the mountains, perhaps they may, in turn, help us understand and trust each other. FM

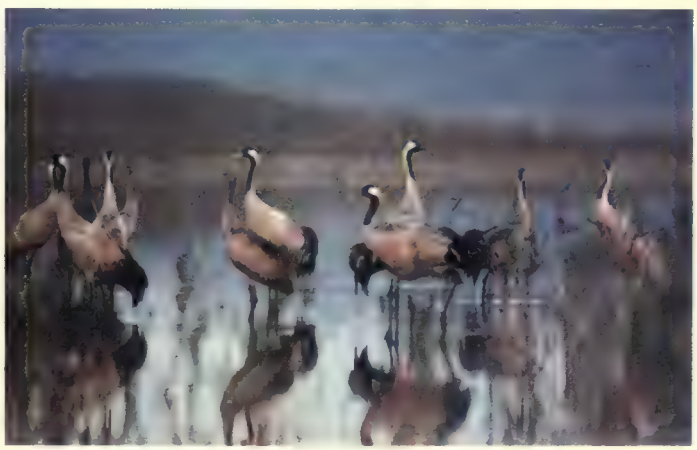


Red-crowned crane, juvenile

George Archibald with red-crowned crane chick

Red-crowned crane over Korea's demilitarized zone

Common cranes in Iran



Participants enjoyed the class on Lake Michigan limnology which took place on board the Research Vessel Rachel Carson.

Adult Education Program

by Robert B. Pickering
Program Developer, Department of Education

photos by the author

As an educational institution, Field Museum possesses certain special advantages. It has no football team. It gives no course credits or course examinations and awards no degrees.... Formal education, moreover, in schools, colleges and universities is something you finish. It is like the mumps, measles, whooping-cough or chicken-pox. Having had education once, you need not, indeed you cannot, have it again. ...The Museum is free from this regrettable tradition. ... The Museum is seductive. Perhaps because it does not employ compulsion, but woos the learner with artful wiles, it continues to deceive him into educating himself as long as he lives. (From an address by Robert Maynard Hutchins, president of the University of Chicago, September 15, 1943.)

Field Museum's Adult Education Program began in 1975, with 134 participants enrolled in 5 classes. By 1983 four terms were in place and the number of courses had jumped from 5 per term to over 30, with a total of 3,000 persons enrolled. During seven years the program has grown rapidly, and the participants have learned that Field Museum is a place to find unique opportunities that are both informative and fun. The greater appeal is the ambience offered for self-directed adult learners.

The 1970s saw increasing interest in adult education and in life-long learning opportunities. People began taking courses in subjects as diverse as wine tasting and fly-tying. Previously, adults had favored courses designed for professional advancement, then interests shifted to courses for enjoyment and self improvement. The communication explosion, rapid transportation, television, and computers have opened vistas never before explored. People want to know about the Mayas, myths of origin, animal behavior, reproductive strategies —subjects that reveal the mysteries of life and people.

Field Museum's Adult Education program sets high standards for teaching.

Subject mastery is the minimum requirement; but beyond that, the instructor must be able to communicate with enthusiasm and quickly assess group experience and interests. Each course focuses on an aspect of natural history or anthropology—the strengths of the collections. The courses present topics that cannot be addressed in programs offered by other institutions. The Museum's exhibits and research collections are the base resource for courses. People are amazed at how much more they can observe when they have the chance to discuss specimens or artifacts with a specialist. Each object takes on a new importance.

Many instructors are Museum scientists or are specialists recommended by the Museum's scientific staff. They are well informed about the latest developments in their respective fields. Information discussed in class is often more recent than the material found in the popular press or in the latest textbooks. Participants often examine specimens which are not on exhibit and are able to use facilities that the public has limited access to.

Top: *An intimate look at fishes includes viewing them in their natural habitat and examining preserved specimens in research collections.* Bottom: *Dave Willard, collection manager of birds, discusses fine points of identification with students.*

Where else can one learn about the evolution of various life forms and have such a wealth of specimens to examine? Courses focus on the diversity and beauty of the world around us. They provide new ways to view natural and human history. Clusters of related courses are offered to provide a wide range of experience on specific subjects. For example, the subject of textiles—from fiber properties to kinds of dyes—may be covered. Weaving equipment from different regions is compared, while courses on textile conservation develop skills for the proper storage and care of one's own precious fabrics.

Why do people take courses at Field Museum? Past participants say that they try to stay current with developments in their field of academic interest. Many are graduates in anthropology, history, or the social sciences, but do not work in these fields. They may instead be brokers, lawyers, or in business. Courses help people stay in touch with interests, new and old. Meeting new people who have similar interests and wish to exchange information is another advantage. Taking a class is often an introduction to a network of involved people.

"Field Museum courses are as special as Field Museum itself." This is the main standard of the Adult Education program, and one that program participants should expect.

In order to continually improve our program, we ask you to complete and send in the questionnaire on the following page. Your answers will help us to know whether we are providing the kind of program that Museum members want. Your cooperation is important. Please send the completed form to: Adult Education, Department of Education, Field Museum of Natural History, Roosevelt Road at Lake Shore Drive, Chicago, IL 60605. For more information, please call 322-8855. The spring courses begin the week of April 9.

Adult Education Member Survey

Mail to: Adult Education, Dep't of Education, Field Museum, Roosevelt Rd. at Lake Shore Drive, Chicago, IL 60605

Age ___ Sex ___ Occupation _____ Zip Code _____

How long have you been a member of Field Museum?
Less than 2 years ___ Two to 5 years ___ More than 5 years ___

Were you aware that Field Museum offers courses for adults? Yes ___ No ___

When you receive the courses for adults brochure in the mail do you:
___ Look for a subject that is of interest to you
___ Flip through the brochure and look at the illustrations
___ Discard the brochure
___ Pass the brochure on to a friend who might be interested
___ Other (explain): _____

Have you ever taken an adult class at Field Museum? Yes ___ No ___

Which statement best describes how often you take classes?
___ Never ___ At least twice a year ___ When a subject of interest to me is offered
___ Once ___ Almost every term ___ When the weather is good
___ When I can persuade a friend or spouse to take a class also

I have never taken a class at Field Museum because:
___ Inconvenient class times ___ Transportation difficulties
___ Tuition cost ___ Subjects
___ Other (explain) _____

Have you taken classes elsewhere in the Chicago area? Yes ___ No ___

If yes, where? _____

Why do you take classes here or elsewhere?
___ Long-term interest in a particular subject ___ General enjoyment
___ Just for something to do ___ Occupational advancement
___ Opportunity to meet others with similar interests

What courses would you like to see offered in Field Museum's program?

_____

_____

When would it be most convenient for you to attend classes?
___ Once a week on a weekday evening ___ Once a week on a weekday afternoon
___ Once a week on a weekend during the day ___ All day Saturday and/or Sunday

TOURS FOR MEMBERS

Ron Testa

ALASKA NATURAL HISTORY TOUR

June 1984
$4,185

Experience the Great Land. Descriptions of Alaska are filled with superlatives—a state more than twice the size of Texas with a population less than that of Denver, 33,000 miles of coastline, 119 million acres of forest, 14 of the highest peaks in the United States culminating in Mt. Denali (formerly Mt. McKinley), at 20,320 feet. Alaska is equally a land of wildlife superlatives, from her great herds of caribou to swarming seabird rookeries to surging salmon in migration. When one thinks of Alaska one thinks of wilderness, of nature still fresh and undomesticated, of experiences dreamed of but mostly unavailable to us of the lower 48.

Join us for an Alaskan odyssey through a wide range of habitats from the rockbound fur seal and sea bird colonies of the Pribilofs, to the dripping forest and calving glaciers of the southeast, to the grandeur of the Alaskan Range, to the Fjordlike quiet and beauty of the inland passage.

Our travels will be by plane, train, bus, boat, horseback, and foot—whatever best enhances our experience. Emphasis will be on the land, its history, its wildlife. Interpretation combined with direct observation will provide an enjoyment and quality of experience unavailable to the casual visitor. Whatever your interest in natural history—marine mammals, birding, mountains, photography, flowers, forests, glaciers, rivers—this tour will show you Alaska in all its diversity and splendor.

The tour will be led by Dr. Robert Karl Johnson, Chairman of the Department of Zoology of Field Museum.

GRAND CANYON ADVENTURE

May 25 - June 3

Many of us have beheld the Grand Canyon from the rim or while flying overhead, and some of us have hiked partway down to the Colorado River. But there is another Grand Canyon that relatively few have experienced: Field Museum is offering you the opportunity to see and experience the canyon from the river.

The 280-mile trip will be by two motorized rubber rafts. We'll sleep on sandy beaches under the stars and our meals will be excellent. Along the way, we'll hike to places of unusual geologic and anthropologic interest, sometimes through the most pleasant and enchanting stream beds and valleys, at times along the waterfalls. We'll see and study more geology in this one brief period than can be seen anywhere else in comparable time. Dr. Bertram Woodland, curator of petrology, will be our tour leader.

The trip will begin on Friday, May 25, with a flight to Las Vegas, where we will remain overnight. Saturday we'll leave by deluxe bus for Lees Ferry, where we'll board the rafts. The trip will end 9 days later, at Pierce Ferry, near the head of Lake Mead. We'll return to Chicago, via Las Vegas, Sunday, June 3.

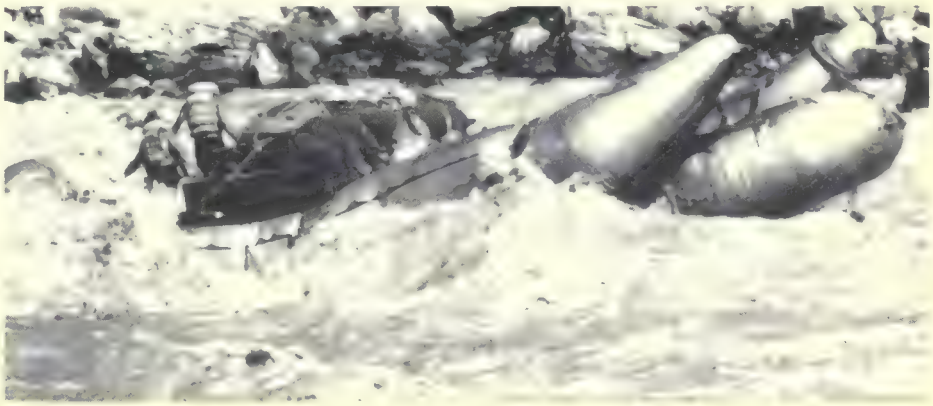
You needn't be a "rough rider" to join this expedition—you needn't even know how to swim. Persons of any age can enjoy the river with equanimity, and come out proud and happy to have experienced this extraordinary adventure.

The cost (to be announced) per person covers all expenses (including air fare, board fees, waterproof bags for gear, sleeping bags, etc.), and all meals. The trip is limited to 25 participants.

ADDITIONAL TOUR GEMS SLATED FOR 1984

- China and Tibet
- Kenya
- Peru
- England's Old Inns, Old Homes, Old Castles, and Old Gardens.

For additional information on any tour, please call Tours Manager Dorothy Roder at 322-8862 or write Field Museum Tours, Roosevelt Road at Lake Shore Drive, Chicago, IL 60605.



WITH FLEMING
46 PLEASANT
OAK PARK ILL 60302

Eskimo Art & Culture

At Field Museum March 10 through May 27
Comprising two superb exhibits:
"Grasp Tight the Old Ways:
The Klamer Family Collection of Inuit Art,"
Featuring 20th-century Eskimo Art
and
"Inua: Spirit World of the Bering Sea Eskimo,"
Featuring Eskimo art and artifacts collected a century ago
Special lectures on Eskimo Art and culture March 10 and 17
(see pages 3 and 4)

Members' Preview
Friday March 9, 5:30-8:00 pm
With special events for children

FIELD MUSEUM OF NATURAL HISTORY BULLETIN

April 1984

Exhibit: "Black Folk Art in America: 1930-1980" April 14-July 15

"What is Folk Art? Symposium" April 14

Black Folk Art Lectures: April 28, May 5, 19

Family Feature: "Flights of Fancy"—Birds, Kites & Kids April 1

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CONTENTS

April 1984
Volume 55, Number 4

April Events At Field Museum 3

Fossil Plant Collections at the Field Museum
by Martha S. Bryant, collection manager of fossil invertebrates and fossil plants, and Peter R. Crane, assistant curator of paleobotany 5

Black Folk Art in America 1930-1980
by Richard Powell, guest curator and consultant 11

Market Art from Northeastern Asia
A 19th-Century Siberian Souvenir 19
by James W. VanStone, curator of North American archaeology and Ethnology

Environmental Field Trips
by Keith Mason, program developer, Department of Education 22

Field Briefs 26

Field Museum Tours for Members 27

COVER

Crucifixion, 1940, by Elijah Pierce. Carved and painted wood on painted wood panel, 47 x 30½." From the Elijah Pierce Art Gallery, Columbus, Ohio. The work of Pierce is among that of 19 other painters, sculptors, and graphic artists in the new exhibition, "Black Folk Art in America 1930-1980," on view at Field Museum April 14 through July 15. See pages 11-18 and, for schedules of related events, the back cover.

This exhibition was organized by the Corcoran Gallery of Art, Washington, D.C., and sponsored by grants from Atlantic Richfield Foundation and the National Endowment for the Arts, Washington, D.C. The Chicago showing of this exhibit was made possible by a grant from the Atlantic Richfield Foundation.

Cover photo courtesy Corcoran Gallery of Art.

Eskimo Art and Culture

comprising two exhibits:
"Inua: Spirit World of the Bering Sea Eskimo"
and
"Grasp Tight the Old Ways:
The Klamer Family Collection of Inuit Art"
continues on view through May 27

Events

Black Folk Art Symposium and Lecture Series

This series is designed to complement the special exhibit "Black Folk Art in America: 1930-1980." The lectures are funded by a grant from the National Endowment for the Humanities, a federal agency.

"What is Folk Art?: Symposium"

Saturday, April 14, 2:00-5:00pm, James Simpson Theatre, West Entrance

This symposium explores the varied and often contradictory viewpoints of a social historian, a museum curator responsible for an institution's collections, a contemporary gallery owner, and a private collector.

Each member of the panel presents his or her own view of "What is Folk Art?" After a brief question-and-answer period from the audience, the symposium continues with the panel members discussing their opposing viewpoints.

Symposium Panel: Sterling Stuckey, professor of history, Northwestern University; Lynda Roscoe Hartigan, assistant curator, 20th century painting and sculpture, National Museum of American Art, Smithsonian Institution; Phyllis Kind, Phyllis Kind Galleries, Chicago and New York; James T. Parker, private collector. Moderator: Richard Powell, guest curator, "Black Folk Art in America: 1930-1980," Field Museum.

"Indelible Icons: The Black Atlantic Visual Tradition"

Robert Farris Thompson, professor, history of art, Yale University
Saturday, April 28, 2:00pm, James Simpson Theatre, West Entrance

Following the slave trade routes from the west coast of Africa to Brazil north to the United States, Robert Thompson describes various cultural phenomena—dance, music, street festivals. Emphasizing religion and performance, he illustrates how these same phenomena reemerge in the Americas. Though a serious scholar, Dr. Thompson's classroom persona is part preacher, part dance-hall leader and performer. His research is concentrated on cultures from the west coast of Africa.

"Origins and Development of Black American Folk Art"

Regenia A. Perry, professor of art history, Virginia Commonwealth University
Saturday, May 5, 2:00pm, James Simpson Theatre, West Entrance

The earliest surviving examples of black American folk art include pottery, quilts, wood carving, basketry, iron work, and painting. Dr. Perry traces the development of this art through the 18th, 19th, and 20th centuries, explaining the remarkable persistence of certain "Africanisms" throughout the course of black American folk art history. Dr. Perry is an avid collector of black folk art and is responsible for the essay "Origins and Development of Black American Folk Art," in the exhibit catalog *Black Folk Art in America: 1930-1980.*

"Memory and Sense of Place in Black Folk Art"

William Ferris, director, Center for the Study of Southern Culture
Saturday, May 19, 2:00pm, James Simpson Theatre, West Entrance

Family, region, and place influenced traditional African artists and continues to influence the black American folk artist today. William Ferris looks at the contributions of black culture to the American experience, focusing on folk artists of the rural south. The Center for the Study of Southern Culture is located on the campus of the University of Mississippi and is a clearinghouse for information on regional studies of southern culture. As a folklorist who talks to the folk as well as studying their artifacts, Dr. Ferris has found Mississippi a vital research area.

Series Tickets—Symposium and Individual Lectures: $17.00 (Members: $10.00). Individual Tickets for each program: $5.00 (Members: $3.00). Fees are nonrefundable. Please use coupon to order tickets. For further information please call (312) 322-8854.

Drinker with Hat and Bottle, *1939-42 Compressed charcoal pencil on paper, 13½ x 7⅝" Collection of Mr and Mrs Joseph H Wilkinson On view in "Black Folk Art in America 1930-1980" April 14-July 15*

CONTINUED >

CONTINUED FROM PAGE 3

Events

Edward E. Ayer Film Lectures

Travel the world on Thursdays in April, at 1:30pm in James Simpson Theatre. Admission is free. Doors open at 12:45pm. Members please bring membership card for priority seating privilege.

April 5 **"Colorado—Where the West Comes Alive"** with Frank Nichols

12 **"Superior"** with Tom Sterling

19 **"Peru"** with Alan Hubbard

26 **"Israel – The Holy Land – Past and Present"** with Clay Francisco

Family Feature

"Flights of Fancy"
Sunday, April 1; Hall 21, Birds

Kites have been used in weather watching, boat towing, bridge building, and even military spying since 1000 B.C. Yet their flight patterns only compare to one of the many forms used by birds. Join us for a tour of the bird halls to find out about the different kinds of bird flight. Then with the help of the Chicagoland Skyliners Kite Club, make a kite of your own and decorate it like your favorite bird. Participants should bring a large #20 brown paper bag. After making your own kite, watch Stanley Field Hall fill with flying colors as the Skyliners demonstrate their special indoor kites.

Family Features are free with Museum admission; tickets not required.

April Weekend Programs

Each Saturday and Sunday you are invited to explore the world of natural history at Field Museum. Free tours, demonstrations, and films related to ongoing exhibits at the Museum are designed for families and adults. Listed below are only a few of the numerous activities available each weekend. Check the *Weekend Passport* upon arrival for the complete schedule and program locations. These weekend programs are free with Museum admission and tickets are not required. The programs are partially supported by a grant from the Illinois Arts Council.

April

7 11:30am. ***Ancient Egypt.*** Tour the Museum's Egyptian exhibit and investigate the traditions of ancient Egyptian civilization from everyday life to mummification and the promise of an afterlife.

8 12:30pm. ***Museum Safari.*** Seek out shrunken heads from the Amazon, mummies from ancient Egypt, and big game from Africa.

14 2:00pm ***Spring Wildflowers.*** A slide lecture featuring the wildflowers found in Chicago's woods, meadows, and prairies.

15 12:30pm. ***Highlights of Field Museum.*** Tour some of Field Museum's most famous exhibits, from an African watering hole to the tombs of the Egyptians.

1:00pm. ***Spring Wildflowers.*** A slide lecture featuring the wildflowers found in Chicago's woods, meadows, and prairies.

21 2:00pm ***Red Land/Black Land.*** Tour the Egyptian exhibit focusing on the geography of the Nile Valley and the effect it had on the Egyptian's lifestyle.

29 12:30pm. ***Museum Safari.*** Seek out shrunken heads from the Amazon, mummies from ancient Egypt, and big game from Africa.

Walking Stick, *by William Rogers, 1939 Wood 33¼" high Collection of Dr and Mrs William Bascom. On view in "Black Folk Art in America 1930-1980" April 14-July 15*

Registration

Please complete coupon for your program selection and any other special events. Complete all requested information on the application and include section number where appropriate. If your request is received less than one week before program, tickets will be held in your name at West Entrance box office until one-half hour before event. Please make checks payable to Field Museum. Tickets will be mailed on receipt of check. Refunds will be made only if program is sold out.

Program Title	Member Tickets #Requested	Nonmember Tickets #Requested	Total Tickets #Requested	Amount Enclosed
			Total	

Name

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Have you enclosed your self-addressed stamped envelope?

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Return complete ticket application with a self-addressed stamped envelope to:

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Field Museum of Natural History
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Fossil Plant Collection At the Field Museum

The Development And Utilization Of a Resource

by Martha S. Bryant and Peter R. Crane

Carboniferous forest reconstruction in the Ernest R. Graham Hall (Hall 38) of the Field Museum. 75400

The definition of a museum, in almost any dictionary, will simply refer to a building with exhibits. As far as it goes, this is a definition within which the Field Museum is certainly included, but it is inadequate for effectively conveying the diversity of educational, exhibit, and research activities in which the Field Museum is engaged. The Field Museum of Natural History is fundamentally different from most other museums in its concern not only with the dissemination of knowledge, but also with basic research by which our understanding of Man, and the world in which he lives, is increased. Our exhibits represent a minute fraction of the Museum's total collection, which primarily serves as a major resource for original research by Museum staff and the international scientific and scholarly community.

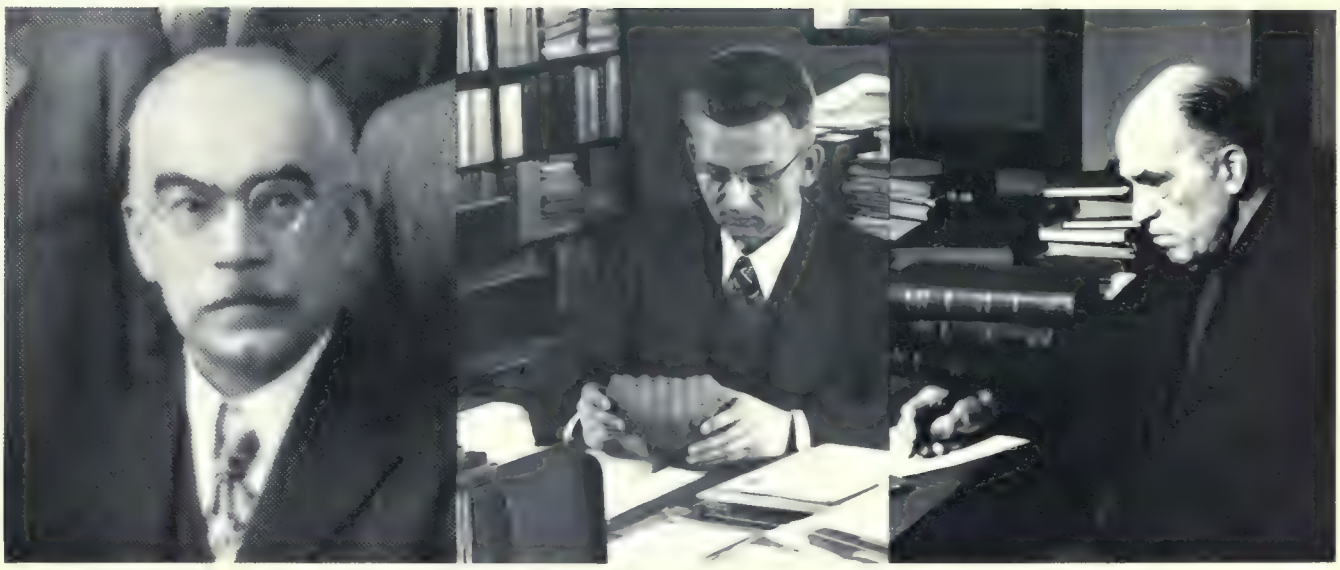
The exhibits of fossil plants which can be found in the Plants of the World Hall (Hall 29) and the Hall of Invertebrate Paleontology (Hall 37) are merely a tiny sample of the 50,000 specimens comprising the paleobotanical collections. The collection is curated and administered by the Department of Geology and occupies 125 steel cabinets in a storage facility constructed in 1965 with the support of the National Science Foundation. Although no precise inventory of paleobotanical resources has ever been taken in the United States, the collection at the Field Museum is certainly among the five largest in the country.

Unlike collections in other areas of the Museum, the fossil plants are not arranged according to a classification of different groups of organisms, but in a stratigraphic sequence, that is, according to their geologic age. This is preferred because of the difficulties of precisely classifying many of the plant remains and the importance of retaining as much information as possible about which plants were associated in the same fossiliferous sediments. The collection begins with the remains of simple algae from the Pre-Cambrian Era over 1,000 million years ago, and ends with plants of the Pleistocene Ice Ages only a few thousand years before the present. A short walk through the collection is a walk through time, and a casual glance in occasional drawers is enough to graphically illustrate most of the major events in the evolution of plant life on this planet.

The fossil plant collection is the single common denominator at the center of paleobotanical activity at the Field Museum, providing specimens for professional scientific research as well as materials for exhibits and teaching. These activities also extend beyond our own Museum. We have material on display, for example, at the Smithsonian Institution and the Milwaukee Public Museum, and specimens are regularly used for courses taught at the University of Chicago.

The collection is a resource which has grown steadily for over ninety years, as specimens have gradually been accumulated by staff, amateurs, and other professionals associated with the Museum. In 1965 its size was almost doubled, and its scientific importance substantially en-

Martha S. Bryant is collection manager of fossil invertebrates and fossil plants; Peter R. Crane is assistant curator of paleobotany.



Adolph C. Noé. 82888 *Theodor K. Just.* 80331 *George Langford, Sr.* 80771

hanced, by the incorporation of the classic Walker Museum collections from the University of Chicago. Since the late 1960s the collection has remained almost dormant, but in the last eighteen months, the level of activity has risen dramatically, with a renewed commitment to paleobotany at the Field Museum. A full-time professional paleobotanist has been appointed to the scientific staff and the number of specimens acquired, the number of visitors to the collections, the number of loans made to other institutions, and the number of scientific studies using Field Museum specimens have all begun to increase. A start has also been made on computerizing information about parts of the collection. Keeping track of 50,000 specimens is not always a straightforward proposition!

It is perhaps not surprising that a major strength of the paleobotanical collection is plants of the Pennsylvanian period (310-280 million years ago). At that time much of Illinois was covered by shallow seas, fetid deltas, and swampy luxuriant forests. The remains of these forests formed the coals on which much of the industrial strength of the central and eastern United States has traditionally been based. About sixty percent of the paleobotanical collection is from the Pennsylvanian, and the full spectrum of "Coal-Age" plants is represented by specimens which are often spectacular and unusually well preserved. About half are from the world-famous nodule localities of Will, Grundy, Livingstone, and Kankakee counties in northeastern Illinois. The best known of these are along the banks of Mazon Creek, and the fossil plants from this whole area have come to be known as the "Mazon Creek flora."

The nodules which contain the plants are concretions of fine mud and silt cemented together by various iron minerals. They formed quickly as muddy deltas gradually expanded over areas once covered by swamp forest, and they contain a variety of plant fragments such as seeds, leaves, cones, bark, and roots. The rapidity of preservation has prevented many of the fossils from being compressed, and they are beautifully preserved in three dimensions. In many cases minerals have been deposited in the cavities left as the plant tissues rotted; but occasionally, the tissues themselves are impregnated with calcium carbonate or iron pyrite and fine details of internal structure are preserved.

Specimens preserved in calcium carbonate can be easily studied using the coal ball peel technique (see "The Inside Story on Fossil Plants," November, 1983 *Bulletin*), but it is only recently that new methods of preparation have revolutionized research on pyrite plant fossils. As many of the Mazon Creek plants are pyritic, this has done much to enhance the scientific importance of the Field Museum collection. Several other large collections of these nodules are housed in museums and universities throughout the country, including Harvard University, the Illinois State Geological Survey, and the Illinois State Museum; but the outstanding collection at the Field Museum numbers over 15,000 specimens and is probably the most extensive and most important in the world.

The very earliest studies of Pennsylvanian plants from Illinois were made by the pioneering North American paleobotanist Leo Lesquereux (1806-89), between 1866 and 1884. Much of his original material came from Mazon Creek itself, but in the first two decades of this century increased coal-mining activity provided the stimu-

lus for more intensive investigations of these fossils and their use in tracing and correlating coal deposits. Some of the most important early research was carried out in conjunction with the newly formed Illinois State Geological Survey between 1906 and 1909 by Charles David White, then curator of paleobotany at the United States National Museum; but during the 1920s White's work was continued by Adolph C. Noé at the University of Chicago.

Noé (1873-1939) gained his paleobotanical training at the University of Graz, Austria under the eminent European paleobotanist Constantin von Ettingshausen, but in 1899 he emigrated to the United States and obtained his doctorate in Germanic languages at the University of Chicago. He remained on the language faculty until 1923, when he was appointed assistant professor of paleobotany in the Botany and Geology Departments. In the following year he took on additional responsibilities as curator of fossil plants in the Walker Museum, and most of the specimens he curated, as well as those used in his research, are now part of the Field Museum collection.

Noé had an engaging personality and developed a close association with his scientific colleagues at the Field Museum. In 1933 he was appointed a research associate on the staff of the Botany Department. Noé's link with the Field Museum provides a perfect example of the kind of close relationship between research, education, and exhibition which is rarely possible at most universities and museums. His expertise and familiarity with Pennsylvanian plants derived from his scientific work on Mazon Creek and other collections was expressed directly in the magnificent Carboniferous forest reconstruction in the Ernest R. Graham Hall (Hall 38). This outstanding diorama was constructed by the same team of expert craftsmen responsible for the models in the Plants of the World Hall (see "The Botanical World in Replica," September 1983 *Bulletin*), and with Noé providing the essential paleobotanical advice and encouragement. The result is an irreplaceable masterpiece of scientific illustration which remains as one of the most realistic representations of what coal forest plants may have looked like. Although we have learned a great deal about Pennsylvanian plants and their paleoecology since the diorama was completed in 1931, and might wish to alter some interpretations, this extraordinary achievement is still the most meticulous and atmospheric rendering of Pennsylvanian vegetation in existence. It has been illustrated in countless articles and textbooks and has perhaps contributed more than anything else to the popular image of what a coal swamp might have looked like.

Left: Lepidostrobus. *A complete cone of an extinct club-moss tree still attached to two shoots bearing leaves. Middle Pennsylvanian, Vermilion County, Illinois. The cone is about 60 mm long. Field Museum Paleobotanical Collections, PP 23918.* **Center:** Alethopteris. *Leaf from an extinct "seed-fern." Middle Pennsylvanian, northeastern Illinois. The leaf is about 20cm long. Field Museum Paleobotanical Collections, PP 30099.* **Right:** Calamostachys. *A complete cone of an extinct horsetail tree from the Middle Pennsylvanian of Illinois. The cone is 110mm long. Field Museum Paleobotanical Collections, PP 2604.*

Triphyllopteris. *Leaves of an extinct fernlike plant from the Early Mississippian; Price Formation, Virginia. Specimen recently obtained on exchange. Each leaf is about 10mm long. Field Museum Paleobotanical Collections, PP 33643.*

Sphenophyllum. *Whorled leaves from an extinct horsetail. Pennsylvanian, "Mazon Creek flora" of northeastern Illinois. Each whorl is about 12mm wide. Field Museum Paleobotanical Collections, PP 25083.*

Perhaps Noé's major contribution to paleobotany was his recognition during the early 1920s that coal balls previously known only from Europe also occurred in North America. Some of his many students went on to pioneer the study of North American coal ball plants and laid open the way for many of the major paleobotanical advances of the last fifty years. Some of the specimens used in these classic investigations at the University of Chicago are now housed at the Field Museum.

Other students of Noé devoted their energies to Mazon Creek plants, and one of these, Richard E. Janssen, did much to stimulate the interest of local amateur collectors. Janssen first met Noé while employed as a preparator at the Field Museum, working on the Carboniferous forest reconstruction. As his interest in fossil plants developed, he studied under Noé for a Ph.D. at the University of Chicago, before going on to establish his own academic career. With Noé's encouragement, Janssen utilized specimens now in the Illinois State Museum and Field Museum in providing the first popular guide for collectors to Pennsylvanian plant fossils. George Langford, Sr. (1876-1964) was one of the most avid of these amateurs and went on to accumulate the bulk of the Field Museum Mazon Creek collection.

Langford had worked intermittently, as an amateur, at the Field Museum for many years, but did not join the staff until 1947 at the age of 71. With the same energy and vitality which had sustained him through a spectacular career in engineering involving over 75 U.S. patents, he applied himself tirelessly to the collection, curation, and study of Mazon Creek fossil plants. In total, Langford estimated that he must have collected about one quarter of a million specimens, of which he only kept the best, about one tenth—a mere 25,000! In addition to his truly prodigious collecting activities, Langford also found time to write two popular books on the flora and fauna of the Mazon Creek area. These were published by the Earth Science Club of Northern Illinois and in conjunction with that of Janssen have served as the indispensable handbooks of local collectors for the last twenty years.

Eugene S. Richardson, Jr. (1916-83), a curator of invertebrate paleontology at the Field Museum for over 30 years, collected closely with Langford. Although his Mazon Creek research focused on the uniquely preserved animal fossils, Richardson also made important additions to the fossil plant collections. Perhaps his greatest influence, however, was indirect, through his unrivalled rapport with the many highly motivated amateurs of northern Illi-

nois. Richardson gave freely of his time and expertise, and his friendships ultimately led the late Jerry Herdina and many others too numerous to mention by name to generously contribute significant personal collections of fossil plants.

The Field Museum's Mazon Creek collection built up by Noé, Langford, Richardson, and others has provided material for a wide range of scientific studies. William C. Darrah (formerly of Harvard University and Gettysburg College) used the collection in a major review of Pennsylvanian floras in eastern North America which emphasized the use of the plants in geological correlation. Hermann W. Pfefferkorn (University of Pennsylvania), Tom L. Phillips (University of Illinois), Russell A. Peppers (Illinois State Geological Survey), and William A. DiMichele (University of Washington) have described specimens which are either totally new to science or preserved in an unusual and botanically informative way. Andrew C. Scott (University of London) and Thomas N. Taylor (Ohio State University) have used the collection to draw some fascinating inferences on the interactions between plants and animals during the Pennsylvanian, and Langford and Janssen have described and illustrated Field Museum specimens in compiling their guides for amateurs. These few examples illustrate something of the diversity of research which the Field Museum Mazon Creek collection has supported and will continue to support for many years to come.

As well as the collection of Illinois nodule floras, there are also Pennsylvanian plants from a large number of other localities in eastern North America and Europe. Although only a small proportion of these are spectacular "exhibit quality" specimens, many are of considerable scientific interest. For example, those collected by Ralph D. Lacoe (1824-1901) were identified by Charles David White and Leo Lesquereux, and provide a rare and important insight into the ideas of two of the major figures in the early days of North American paleobotany.

About half of the Field Museum collection of fossil plants consists of specimens which are younger than Pennsylvanian in age. Some of the most spectacular of these are specimens from the Cerro Cuadrado Petrified Forest in Argentina, collected by Elmer S. Riggs (1869-1963) on Field Museum expeditions to Patagonia. Riggs came to the Museum from Princeton University in 1898 to become the first curator of vertebrate paleontology. The South American adventures during the 1920s were just two of sixteen collecting expeditions which he conducted for the

Lepidodendron. *Three-dimensionally preserved leaf-cushions of an extinct club-moss tree. Middle Pennsylvanian, Grundy County, Illinois. Each leaf-cushion is about 5mm long. Field Museum Paleobotanical Collections, PP 16432.*

Museum, the primary goal of which was to collect large fossil vertebrates. Some of these are now on display in the Ernest R. Graham Hall. Almost as an incidental interest, Riggs and his party accumulated a very large collection of petrified "pine cones" which, along with a similar collection in the British Museum of Natural History, is the most important of its kind in the world.

The specimens which Riggs brought back included cones, fragments of wood, and even seedlings which had been petrified under the influence of volcanic activity. Beautifully preserved in silica, the specimens were first studied by George R. Wieland of Yale University and Bertha S. Darrow, a student of Noé, during the 1920s and 1930s. They were originally thought to be of early Tertiary

Araucaria mirabilis. *Silicified cone very similar to the living bunya nut tree of Queensland, Australia. Jurassic of Sierra Madre y Higa, Argentina: collected by E. S. Riggs, 1924. The cone is about 75 mm long. Field Museum Paleobotanical Collections, PP 33688.*

Neuropteris rarinervis. *Leaf from an extinct "seed-fern" figured by Noé in his "Pennsylvanian Flora of Northern Illinois." Pennsylvanian, Bureau County, Illinois. The leaf is about 20 cm long. Field Museum Paleobotanical Collections, PP 33685.*

Annularia. *Whorls of leaves from an extinct horsetail tree. Middle Pennsylvanian, "Mazon Creek flora" of northeastern Illinois. Each whorl is about 45mm in diameter. Field Museum Paleobotanical Collections, PP 16935.*

age (approximately 60 million years old), but are now thought to be much older and probably Jurassic (approximately 170 million years old).

The collection contains two different kinds of cones. The most recent research by Ruth Stockey of the University of Alberta has revealed that they contain extremely fine details of embryos and other reproductive structures which are very rarely preserved in most fossil plants. Stockey has also shown that the two cones represent quite different evolutionary situations in relation to the living families of conifers. One *(Pararaucaria patagonica)* shows a peculiar mixture of features found today in a range of different living families, and exactly how it is related to modern forms is unknown. However, the other *(Araucaria mirabilis)* is very clearly related to the living conifer family Araucariaceae, which includes the kauri pines, monkey puzzles, and other trees sometimes grown as ornamentals in the northern hemisphere. Today the family occurs only in the southern hemisphere, and the fossil is closely similar to the living species *Araucaria bidwillii* (the bunya nut), native to southern Queensland, Australia.

The Patagonian material provides a good example of the international coverage of the paleobotanical collection, which also includes specimens from the Devonian of West Germany, the Permian of China, the Jurassic of Mexico, the Eocene of Australia, the Cretaceous of Czechoslovakia, and the early Tertiary of England. Among the treasures of the collection is a small but fascinating suite of Jurassic plants from the Rajmahal Hills of India obtained during the late 1940s by Theodor K. Just (1904-60), then chief curator of the Botany Department. Although Just was not a practical paleobotanist in the sense of routinely working with fossil specimens, he was intensely interested in the fossil record of plant evolution. As an early stalwart in the Paleobotanical Section of the Botanical Society of America, he did much to influence the growth of North American paleobotany as well as encourage the development of the Field Museum collections.

The Upper Cretaceous and early Tertiary plants at the Museum (approximately 100 to 40 million years ago) together account for over a quarter of the total number of

Continued on p. 24

Pregnant Woman, *by Steve Ashby, 1970s. Painted wood and mixed media, 25 x 13 x 8". Collection of Herbert W. Hemphill, Jr.*

"Black Folk Art in America 1930-1980" will be on view at Field Museum April 14 through July 15. For schedules of lectures on Black Folk Art and other related programs see back cover and "Events," page 3.

"Black Folk Art in America 1930-1980" was organized by the Corcoran Gallery of Art, Washington, D.C. and sponsored by grants from Atlantic Richfield Foundation and the National Endowment for the Arts, Washington, D.C. The Chicago showing of this exhibit was made possible by a grant from Atlantic Richfield Foundation.

Photos courtesy the Corcoran Gallery of Art, Washington, D.C.

Black Folk Art in America 1930-1980

by **Richard Powell**
Guest Curator and Consultant

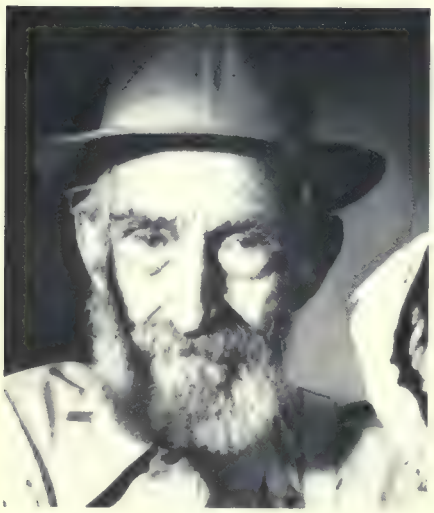
William Dawson, a soft spoken retiring senior citizen of Chicago, carves the most amazing things out of wood. His human figures come in a rainbow of complexions and temperaments, and are always dressed to a "T" in colorful outfits. Bears, pigs, elephants, birds, and an occasional anteater make up the menagerie in his living room, and stand as testaments to his Lincoln Park Zoo "Adopt-an-Animal" certificate on the wall. Carved "totems" of smiling and frowning faces,

William Dawson

capped with a single bird feather, a shock of human hair, or a carved animal head, are especially dramatic.

Often forsaking anatomical precision for an expressive artistic license, Dawson's work represents a tradition of visually oriented Americans who have worked and continue to work in communities across the United States despite critical disdain or neglect. This body, generically referred to as "folk" artists, are represented in an extraordinary exhibition, *Black Folk Art in America: 1930-1980,* organized by the Corcoran Gallery of Art, Washington, D.C.

Following record-breaking viewings in Washington, D.C., Brooklyn, Los Angeles, Houston, Detroit, and Birmingham, *Black Folk Art in America*



Jesse Aaron

Bulldog, *by Jesse Aaron, 1969. Cedar, fiberglass and bone, 25½ x 12½ x 26". Stuart and Mary Purser Collection*

William Edmondson

G. H. McNeal in Year 1929, *by Leslie Payne, 1970s. Painted wood and mixed media, 33½ x 52 x 10". Collection of Herbert W. Hemphill, Jr.*

completes its U.S. tour at Field Museum. William Dawson, along with 19 other painters, sculptors, and graphic artists literally transforms a Field Museum exhibition hall into an environmental art space. Individual in life experience, yet collective in this society's perception of them, these artists add another dimension to American art, and expand that prevailing picture to include other visions and agendas.

Despite the range of techniques, subjects, and visual objectives in *Black Folk Art in America,* certain characteristics stand out that bring these artworks together. For instance, the reliance on "found" materials suggests a common outlook among the three-dimensional artists in this show. Jesse Aaron's selection of zoomorphically shaped wood for his animal carvings is similar to William Edmondson's choice of limestone blocks for religious subjects. The first black artist to have a solo exhibition in New York's Museum of Modern Art (1937), Edmondson conceived of his sculpture as the "Lord's work." Certainly his monolithic "Preachers"

Emancipation House, *by George White, 1964. Painted wood and mixed media construction, 19½ x 23¼ x 18½". National Museum of American Art, Smithsonian Institution.*

Sister Gertrude Morgan

and "Angels" speak to this idea. Sister Gertrude Morgan's creations on discarded window shades and cardboard are in fact art *and* evangelism. Her conception of God, angelic choirs, and herself are always clothed in saintly white robes and didactically overlayed with scriptural text. Interestingly, her self-imposed separation in later years from the secular world coincided with her calling to paint.

Perhaps the most important work on view in *Black Folk Art in America* is a portion of James Hampton's *Throne of the Third Heaven of the Nations Millenium General Assembly.* Discovered in a garage in Washington, D.C. after Hampton's death in 1964, this 180-piece assemblage of furniture parts, cardboard, lightbulbs, and silver and gold foil was conceived by Hampton as a monument to Jesus. Hampton's *Throne* is a classic example of a "collage sensibility" in Afro-American art—a style-current

James Hampton

that runs through quilts, outdoor environmental art, and in more obvious "art" examples as done by Romare Bearden, Benny Andrews, and others. The greater part of the *Throne* is on permanent display at the National Museum of American Art, Smithsonian Institution, where pilgrims of both artistic and spiritual persuasion experience Hampton's profound vision.

Aside from featuring 20 men and women with exceptional talents, *Black Folk Art in America* addresses some other issues. In grouping these artists under the rubrics of "black" and "folk," curators Jane Livingston and John Beardsley open up a Pandora's box of aesthetic discourse. One might ask "What are the criteria, besides race and the absence

Farmhouse with Airplanes, *by Ulysses Davis, 1943. Carved and painted relief, 13 x 15⅝". Collection of Ulysses Davis.*

Yellow Chicken, *by Bill Traylor, 1939-42. Pencil, crayon and gouache on paper, 13⅞ x 8¼". Collection of Charles Shannon.*

of so-called formal art instruction on the part of each artist, that qualifies their work as Black Folk Art?" One part of the answer might dwell in recurring motifs and themes that also exist among various West and Central African peoples. Reptiles, specifically snakes, appear in a number of pieces, and like their African antecedents, they often communicate mediation between spheres of existence (land/water,

Bill Traylor

the world of the living/the world of the dead). Bill Traylor's drawings of snakes and serpentine people capture a West African feeling for nature and man's ever-changing relationship with it. On the "folk" side of this categorizing, the many artists in this exhibition who knowingly embrace sensibilities which their communities maintain as the aesthetic ideal merit a "folk" heading as well. Inez Nathaniel-Walker's eloquent drawings of coiffed, bejeweled, and assertive women cognate with real life portrayals. In spite of her tendency to exaggerate certain features, Nathaniel-Walker is in tune with community or "folk" sentiments concerning feminine style and comportment.

Another accomplishment for this exhibition is its celebration of creativity in one's old age. Comprised of works by artists predominantly sixty and older, *Black Folk Art in America* throws a wrench into the *wunderkind* complex that possesses so much of the contemporary art scene. That these elders are capable of exerting an influence on younger generations of artists is witnessed in the careers of several *Black Folk Art in America* exhibitors. One such artist, Joseph Yoakum, created elegant pen and pastel drawings of landscapes (real and imagined) while living on Chicago's South Side in the 1960s. Yoakum and his drawings eventually caught the attention of Chicago's most promising painters in the sixties, artists like Roger Brown, Jim Nutt, Christina Ramberg, and others. These artists befriended Yoakum, purchased his drawings, and helped to promote him among serious art collectors. Yoakum's almost surreal approach to nature and his intuitive sense of

Two Figures, *(red and brown) by Inez Nathaniel-Walker (detail), 1976. Crayon and colored pencil on paper, 29¾ x 41 7/16". Webb and Parsons Gallery, New Canaan, Connecticut.*

Inez Nathaniel-Walker

Mt. Thousand Lakes in Bryce Canyon National Park Near Hanksville Utah, *by Joseph Yoakum, 1968. Pen and pastel on paper, 12 x 19". Collection of Christina Ramberg and Philip Hanson.*

Joseph Yoakum

color captivated his "discoverers" and furnished visual data for what is now internationally known as the "Chicago school of painters."

The 320 art works and the accompanying artist's biographies in *Black Folk Art in America* not only please the artistic palate and educate the mind's eye, but raise the audience's level of consciousness about cultural resiliency. It is nothing less than the pure power of the spirit that those so-called "deprived" members of our society—the poor and the elderly—would prove their inner strength and aesthetic tenacity through art. Of course, the artists in this exhibition have no need of critical approval, since their reasons for creating art have less to do with art markets than with personal-spiritual assurances. Students of all ages, artists, academics, art enthusiasts, and the average museum visitor can and will gain much from *Black Folk Art in America*. Audiences will gain because the canon that the artists live by is generosity, and that sense of giving permeates the breadth of their lives as well as their visual contributions. FM

MARKET ART FROM NORTHEASTERN ASIA
A 19th-Century Siberian Souvenir

By James W. VanStone
Curator of North American Archaeology and Ethnology

In frontier areas of the world it was explorers, traders, missionaries, and government administrators who created the first demand for native crafts as souvenirs. At first these travelers to remote lands purchased, as mementos of their experiences among exotic peoples, items of material culture made by natives for their own use. As the demand increased, however, native craftsmen produced items specifically for trade. New materials, foreign to the native environment, sometimes made their appearance, but for the most part the form of these souvenirs was firmly rooted in native cultural tradition.

In the early twentieth century, Alaskan Eskimo women manufactured excellent coiled grass baskets by the hundreds, while men engraved ivory pipes, carved animal and human figures from the same material, and made models of traditional artifacts in response to the demand of gold miners, commercial whalers, and members of exploring and scientific expeditions for souvenirs (see the *Bulletin*, November 1982, pp. 12-15).

Along the frontiers of northeastern Asia in the eighteenth and nineteenth centuries a demand for souvenirs was created by members of the elaborate bureaucracy which administered Russia's far-flung Siberian empire and collected tribute from the native peoples. Field Museum's ethnographic collections contain an unusual example of Siberian market art dating from the late nineteenth century and perhaps made to be sold to one of the czar's representatives in the city of Okhotsk, an important trading and administrative center on the Sea of Okhotsk opposite the Kamchatka Peninsula (see map).

In the catalog of the Department of Anthropology, this interesting artifact is described as a "table covering." It was purchased by the Museum in the late 1890s as part of a large ethnographic collection from various locations in northeastern Siberia, particularly from the area around the city of Okhotsk and the island of Sakhalin.

This table covering was made by an Evenk craftsperson, probably a woman. In the nineteenth century the Evenks, formerly known as the Tungus, were the largest and most widely scattered language family in northeastern Asia. They were divided into two large groups separated from each other territorially and practicing different forms of subsistence. The reindeer-breeding and hunting Evenks, makers of this covering, occupied an enormous territory stretching from the Yenisey River in north-

central Siberia to the Sea of Okhotsk, while pastoral and farming Evenks lived much further south in the Transbaikal as well as in neighboring areas of northeastern China and Mongolia.

This Evenk covering (cat. no. 32140) is virtually square, measuring 51cm by 68cm, and made from numerous pieces of brown and white reindeer skin sewn together in an overcast stitch with sinew. It is very fragile, the irregularly shaped light areas in the photograph (fig. 1, front) indicating where the hair has fallen off. The center panel consists of two pieces of brown skin of approximately equal size sewn together vertically down the middle. A 13cm tear in the upper left hand corner has been carefully repaired (fig. 2, back). This center panel is bordered by a narrow band consisting of triangular pieces of alternating brown and white skin. Around this is a much wider band consisting of numerous pieces of brown skin sewn together. At the edges are two narrow borders. The inner one is similar to the band around the center panel, consisting of a pattern of alternating triangular pieces of brown and white skin. According to information in the catalog, the edges were trimmed with short pieces of squirrel, gray fox, ermine, and otter skin. However, only fragments of squirrel and otter skin remain.

The decorative figures on the covering are made of white reindeer skin which at first appear to be appliquéd but actually are cut out and sewn into holes of corresponding size and shape in the covering. Presumably the figures were first cut out and then their outlines traced onto the previously sewn center panel and surrounding bands. In the four corners of the center panel there are floral and leaf ornaments. Veins in the leaves are sewn in a chain stitch with brown perle cotton thread. In the middle of the center panel is a *chum*, the Evenk skin-covered tent, with smoke ascending through an opening in the roof. On one side of the tent is the figure of a man chopping wood and on the other a reindeer tethered to a tree. Sections of the tent covering are outlined with black thread sewn in a chain stitch. The smoke rising from the tent, the reindeer's tether, and needles on the tree are tan thread, while the wood chopper's clothing and features are indicated with black and badly faded red thread.

Ron Testa N109729

Fig. 1.

Above the roof of the tent the words *OKHOTSKAGO OKRUGA* ("from the Okhotsk District") have been stitched in Cyrillic letters with perle cotton thread sewn with a filling stitch. In the late nineteenth century the Okhotsk District included an area around the city of Okhotsk, whose population was primarily Evenk reindeer herders and hunters.

In the wide band around the center panel are depicted two sleds of the east Siberian type, each

drawn by six dogs. There is a man on one sled and a woman on the other. Parts of the outlines of the human figures are delineated with black thread and the sides of the sleds are decorated with triangle patterns in red thread. Dog harnesses are also shown in red, while the traces are tan thread. All the thread sewing on this band is in chain stitch.

Two noted authorities on the cultures of northeastern Asia, Dr. I. S. Gurvich of the Institute of Ethnography, Moscow, and Dr. I. S. Vdovin of the Museum of Anthropology and Ethnography, Leningrad, have examined photographs of this Evenk covering and both are agreed that its prototype was the small, square cover for pack bags worn by reindeer as the herds were moved by the herders in search of better grazing areas. When not protecting reindeer pack bags, such coverings were sometimes used to sit on. Traditionally they were made of white skin taken from the legs of reindeer and brown skin from elsewhere on the body.

The traditional reindeer pack bag cover was undecorated except for a unique ornamental pattern which the Russians call "fur mosaic," achieved by selecting small pieces of skin of contrasting colors to form a dark design on a light background or vice versa. The narrow bands of alternating triangles of white and brown reindeer skin on the Museum's covering are good examples of this form of traditional ornamentation which was also characteristic of Koryak, Chukchi, Siberian Eskimo, and other northeastern Siberian skin workers.

The traditional reindeer skin pack bag cover was easily converted to a wall hanging, rug, or table covering when Russian administrators and travelers to northeastern Siberia created a demand for native crafts as souvenirs. In a recent Russian publication devoted to the decorative arts of northern Siberian peoples, there is an illustration of a rectangular reindeer skin rug which has an elaborate fur mosaic border and on which, in white reindeer skin, are depicted scenes of native life similar to those on Field Museum's table covering. Along the lower edge, also in white reindeer skin, is the date 1904. This rug was made by the Koryak, northeastern neighbors of the Okhotsk District Evenks.

Diane Alexander-White. N109248

Fig. 2.

Fur rugs and wall hangings in a great variety of shapes and sizes are made today by many northern peoples in the Soviet Union. The craftsmanship of skin sewers that impressed the early Siberian travelers, explorers, and administrators, has continued to attract the interest of European Russians who, since the end of World War II, have sought employment in northeastern Siberia in ever-increasing numbers. Decorative skin working is truly a contemporary art form which has its roots in the traditional cultures of the past. FM

Above: *Tall dune grasses capture the attention and imagination of a participant in search of hidden flora and fauna.* Opposite, above: *Environmental field trips provide the opportunity to pause and reflect, examine and enjoy.* Opposite, below: *A hike through a local marsh transforms a simple spring day into a memorable adventure.*

Environmental Field Trips

by Keith Mason
Program Developer,
Department of Education

While trying to rationalize his dissent for man's assault on America's wilderness in the name of "recreation," Aldo Leopold wrote, "The only true development in American recreational resources is the development of the perceptive faculty in Americans." Leopold, author of *A Sand County Almanac* and a leading conservationist of the 1930s, was not the first to note the value of promoting an ecological awareness among us—he was only pleasantly ahead of his time. In the 1960s and '70s, his concerns became real concerns for a growing majority of Americans who realized that our use of land and its resources might indeed contain some misuses and mistakes. From the first "Earth Day" in 1970 and the "Keep America Beautiful" campaign of that same era, environmental education has seen substantial development. Field Museum has been a strong participant in that development.

Beginning in 1973, Field Museum established a program of environmental field trips designed to foster an awareness of the environment in which we live. As part of a larger educational context that included lectures, film series, teacher workshops, and the installation of a major permanent exhibit, "Man In His Environment," the environmental field trip program initially helped participants in understanding how their complex industrial society could coexist with fragile surrounding landscapes such as the Indiana Dunes.

Interest in environmental education soon matured. The public desired to explore intricate environmental relationships in more detail and Field

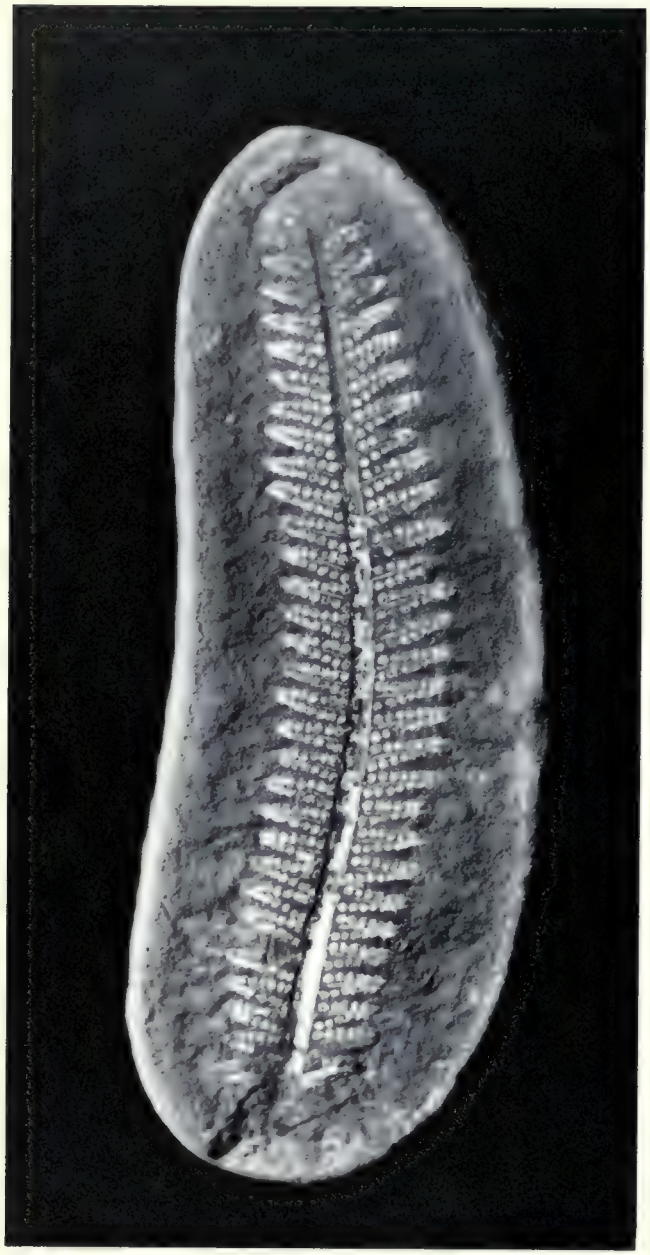
Museum's environmental field trip program expanded to meet these interests. Since 1973, some 10,000 people have enjoyed a day in the out-of-doors with old friends or meeting new ones. Designed for family or adult groups, the field trips have something for everyone. One need not be interested in freshwater aquatic succession to enjoy walking down a cool creek on a colorful autumn afternoon. A person does not have to be able to differentiate a viceroy from a monarch butterfly to stroll through one of the many remnants of Illinois' namesake—the virgin prairie. But, if you would like to discover how a tiny marine shrimp came to be imbedded in the fossilized rock you are holding in your hand or why a tamarack tree, usually found in Canada, is growing right here in northeastern Illinois, Field Museum field trips are just for you. Field trip leaders all possess a special knowledge about the trip destinations and are enthusiastic about sharing that knowledge with you. The active interests of Field Museum scholars and others with appropriate expertise are an integral part of the program.

Field trips depart from Field Museum's West

Entrance on Saturdays and Sundays in the spring and fall. The trips designed for families are activity oriented and participatory learning experiences are used extensively. The adult trips are designed for those with a casual interest in nature and also for the serious student of the environment. They provide the perfect opportunity to get away for a day, learn something new and arrive home with a renewed sense of awareness.

This spring marks the tenth year of the field trip program. The schedule provides exciting and new opportunities for all who participate. You can hike through the canyons of Starved Rock State Park or explore the glacial geology of Lake County. Your whole family can enjoy a collecting trip for wild foods or take part in a scientific sampling of fossils collected at Chowder Flats. If Chicago's cultural history is of interest to you, join us for a tour of our unique ethnic communities. These and many other trips are planned for the spring session which begins the weekend of May 5. For further information consult the Spring Field Trip brochure or call 922-9410, ext. 362. **FM**

FOSSIL PLANTS *con't from p. 10*



Asterotheca. *Fern leaf showing spore producing areas (sori) from the Middle Pennsylvanian, "Mazon Creek flora" of northeastern Illinois. The leaf is about 80mm long. Field Museum Paleobotanical Collections, PP 28530.*

paleobotanical specimens, and consist mainly of leaves and other remains of flowering plants. Today, flowering plants dominate the world's vegetation, but we understand very little about how they arose and evolved. They appear to have undergone a major radiation during the mid-Cretaceous (about 120-90 million years ago), then subsequently diversified throughout the Upper Cretaceous and Tertiary. In conjunction with an understanding of living plants, research on Upper Cretaceous and Tertiary fossils is beginning to clarify exactly how the quarter of a million living species of flowering plants may have arisen.

Large collections from the Eocene clay pits of Kentucky and Tennessee were accumulated by George Langford, his son, and Eugene Richardson. In addition to the ubiquitous leaves, there are also fruits, catkins, and even flowers, many of them from localities that are no longer available for collecting. These specimens have been used extensively by David L. Dilcher of Indiana University in some of the most detailed studies of Eocene fossil plants ever carried out. In the last fifteen years Dilcher has established his laboratory as a major center for the study of early Tertiary fossil plants and has drawn freely on the Field Museum collections. Steven R. Manchester, a former student of Dilcher's, has produced a classic synthesis of the evolution of the walnut family (Juglandaceae) which is currently the most detailed account available of the fossil history and evolution of a single flowering plant family. Throughout his work, Manchester has benefitted considerably from the extensive coverage of early Tertiary material in our collections.

Other Tertiary plant fossils come from many different areas, but the western United States is particularly well represented. Among the collections from Colorado, Montana, Wyoming, and elsewhere is a large series of specimens from the Eagle Creek Formation (Oligocene, 30 million years ago) of the Columbia River Gorge. These are part of the first paleobotanical collections made by Ralph W. Chaney.

Chaney was a native of the Chicago suburb of Brainerd, and following his keen interest in natural history, went to study at the University of Chicago where he met Noé and many other prominent geologists and biologists of the day. Chaney had a particular fascination with ecology, and introduced an ecological dimension into the study of Tertiary fossil floras. He carefully compared fossil communities with their living counterparts and, by extrapolation, began to assemble a picture of the ecological conditions under which the fossil plants may have been growing.

The work on the Eagle Creek Formation was carried out at the University of Chicago, and Chaney went on to teach first at the University of Iowa and later at the University of California. As professor of paleontology at Berkeley, Chaney and his students extended their ecological approach and applied it to a range of fossil floras in western North America. They were remarkably successful in constructing a broad overview of the vegetational and climatic changes in western North America over the last 50 million years. Our understanding of the long-term vegeta-

tional history in this region is now more detailed than for any other area in the world. Although some of Chaney's concepts have come under increasing criticism in recent years, he was the major force in broadening the scope of Tertiary paleobotany to address ecological questions.

The reexamination of Chaney's ideas is just one small example of a basic reorientation which has begun to occur throughout paleontology in the last decade. Much of what has been traditional is being challenged; but whatever changes new methods, new concepts, and new dogma bring, the fundamental importance of specimens and the value of collections will not diminish. In 1973 Tom Phillips, Hermann Pfefferkorn, and Russell Peppers provided an excellent review of the "Development of Paleobotany in the Illinois Basin" (published by Illinois State Geological Survey). They showed very clearly how Illinois, and the Midwest in general, has always been in the forefront of the historical development of North American paleobotany. The collections at the Field Museum are an integral part of this historical legacy and are an important part of the paleobotanical resources in the United States.

The collections are now undergoing their most rapid expansion in over two decades through a broadening program of exchanges with other institutions and active collecting. In the last eighteen months, Cretaceous material from Alabama and Georgia, as well as early Tertiary material from Oregon, Idaho, North Dakota, Wyoming, British Columbia, and Europe has all been incorporated. Most of these specimens will never go on public display. Their purpose is to enhance the primary role of our collection as a continuing resource for original research by Field Museum staff and other scientists. **FM**

Leaves of Glossopteris *from the Permian of New South Wales, Australia. Each leaf is about 100mm long. Field Museum Paleobotanical Collections, PP 33686.*

Quercus clarnensis. *Oak leaf from the Oligocene Bridge Creek Formation, Oregon. The leaf is about 60mm long. Collected by R. W. Chaney. Field Museum Paleobotanical Collections, PP 33687.*

FIELD BRIEFS

DIANE ALEXANDER-WHITE

Assembled before Progress of Mind, *now hanging in Field Museum, are friends of the late artist, Floyd E. Job: (l. to r.) Clifford Buzard, the Museum's Planned Giving officer, Thomas F. Croke, Rita Coyle, Golden M. Walser, Mark Rosner, Beatrice L. Priess, Sophia Nelson, Kathy Marie Garness, Don Llanuza, Larry Lubeck, Pauline Blair, and Mary Hein.*

Artist Floyd E. Job Honored by Friends, Was Donor of His Own Painting, *Progress of Mind*

Friends of the late Chicago artist Floyd E. Job recently gathered on the first anniversary of his death to view his painting, *Progress of Mind*, which he bequeathed to Field Museum in addition to a generous gift to the Museum's Endownment Fund. Mr. Job, a member of Chicago's Palette and Chisel Academy of Fine Art, for more than 30 years was concurrently head designer at both Marshall Field & Co. and at the Merchandise Mart.

The story of man's thoughts—conscious, unconscious, subconscious, past, present, and future—and their effects on man's life and actions—all has been captured in Job's 5½ x 8-foot oil painting, now hanging in the reception area of Field Museum's ground floor administrative suites.

Ironically, *Progress of Mind* is just about the only painting of his extant, for the hundreds of Job's paintings that have hung in exhibitions were burned by him. "They were mere extensions or reflections of this one work," Job remarked. "For 35 years, I carry 'Progress of Mind' in my soul, my body, my own mind. This is all I wanted to do, but I was too busy. This painting was the only thing I ever wanted to do, for through it, I felt I could give a child to the world.

"I have always loved the mind. While I know thousands of people, I never care who the person is, or what he is; initially, I have loved his mind. So, likewise, I have loved the mind of mankind, and felt that the story of the mind of man should be captured in a single painting."

It is a heroic painting, containing hundreds of human figures. Each figure is a vignette of man's life; each tells its own story. *Progress of Mind* is basically simple: while the hundreds of scenes incorporate biology, physics, psychiatry, chemistry, religion, inherited memory, and cultural and educational aspects of life, the picture as a whole starkly reveals that man yet does not understand himself and that his basic nature has not changed since the beginning of human life itself.

Clark Fossil Collection Cataloged by Volunteers

When John Clark, former curator of sedimentary petrology, retired in 1973 from the Department of Geology, he left a legacy of 13,154 paleontological specimens waiting to be cataloged. Now, thanks to the efforts of 16 volunteers, the collection of fossil mammals (mainly Oligocene—38 million to 22.5 million years old), as well as fossil plants, fishes, birds, and reptiles, has been entirely cataloged and curated—a task of four years, two months that required 2,124 actual hours of volunteer time.

Volunteers who participated in the project included Joseph Levin (who alone contributed nearly 796 hours), Cathy Agnone, Turpin Ballard, Susan Boynton, Benny Daniel Dombeck, Carol Hallow, Wally Hastings, Ellen Hyndman, Paul Jensen, Susan Knoll, Gary M. Kocanda, Joan Maynard, Holly Morgan, Steffi Postol, Barbara Roob, and Thelma Schwartz.

The Department of Geology recently hosted a reception for these volunteers in recognition of their achievement. Dr. Clark, who now resides near Rockford, Illinois, was also present to view the volunteers' impressive achievement.

The project was so successful that the department is now planning the cataloging of several tens of thousands of fossil mammals from the Australian latest Tertiary and Pleistocene (5 million to 10,000 years ago), again utilizing volunteer help. Persons interested in this project should call Joyce Matuszewich, volunteer coordinator, for further details.

Retired Curator of Sedimentary Petrology John Clark (2nd from rt.) inspects some of the 13,154 fossil specimens that were cataloged and curated by volunteers, and with him are volunteers who assisted in the project (l. to r.): Mrs. Susan Knoll, Joseph Levin, Clark , and Benny Dombeck.

RON TESTA

TOURS FOR MEMBERS

Ron Testa

ALASKA NATURAL HISTORY TOUR

June 1984
$4,185

Experience the Great Land. Descriptions of Alaska are filled with superlatives—a state more than twice the size of Texas with a population less than that of Denver, 33,000 miles of coastline, 119 million acres of forest, 14 of the highest peaks in the United States culminating in Mt. Denali (formerly Mt. McKinley), at 20,320 feet. Alaska is equally a land of wildlife superlatives, from her great herds of caribou to swarming seabird rookeries to surging salmon in migration. When one thinks of Alaska one thinks of wilderness, of nature still fresh and undomesticated, of experiences dreamed of but mostly unavailable to us of the lower 48.

Join us for an Alaskan odyssey through a wide range of habitats from the rockbound fur seal and sea bird colonies of the Pribilofs, to the dripping forest and calving glaciers of the southeast, to the grandeur of the Alaskan Range, to the Fjordlike quiet and beauty of the inland passage.

Our travels will be by plane, train, bus, boat, horseback, and foot—whatever best enhances our experience. Emphasis will be on the land, its history, its wildlife. Interpretation combined with direct observation will provide an enjoyment and quality of experience unavailable to the casual visitor. Whatever your interest in natural history—marine mammals, birding, mountains, photography, flowers, forests, glaciers, rivers—this tour will show you Alaska in all its diversity and splendor.

The tour will be led by Dr. Robert Karl Johnson, Chairman of the Department of Zoology of Field Museum.

GRAND CANYON ADVENTURE

May 25 - June 3

Many of us have beheld the Grand Canyon from the rim or while flying overhead, and some of us have hiked partway down to the Colorado River. But there is another Grand Canyon that relatively few have experienced: Field Museum is offering you the opportunity to see and experience the canyon from the river.

The 280-mile trip will be by two motorized rubber rafts. We'll sleep on sandy beaches under the stars and our meals will be excellent. Along the way, we'll hike to places of unusual geologic and anthropologic interest, sometimes through the most pleasant and enchanting stream beds and valleys, at times along the waterfalls. We'll see and study more geology in this one brief period than can be seen anywhere else in comparable time. Dr. Bertram Woodland, curator of petrology, will be our tour leader.

The trip will begin on Friday, May 25, with a flight to Las Vegas, where we will remain overnight. Saturday we'll leave by deluxe bus for Lees Ferry, where we'll board the rafts. The trip will end 9 days later, at Pierce Ferry, near the head of Lake Mead. We'll return to Chicago, via Las Vegas, Sunday, June 3.

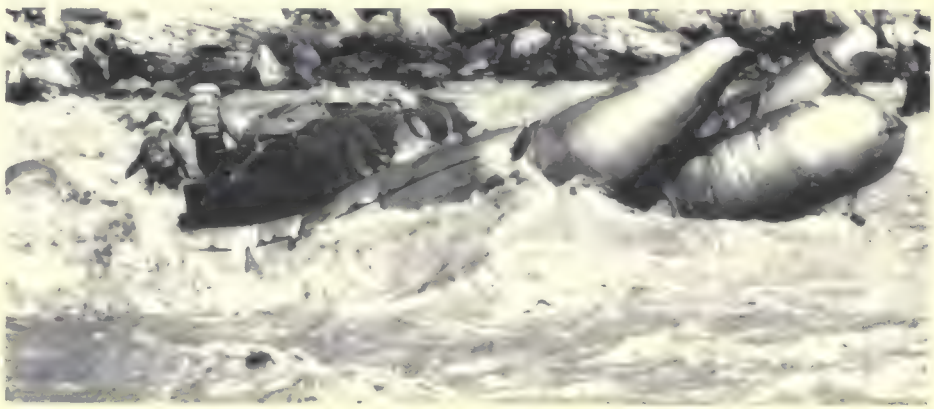
You needn't be a "rough rider" to join this expedition—you needn't even know how to swim. Persons of any age can enjoy the river with equanimity, and come out proud and happy to have experienced this extraordinary adventure.

The cost (to be announced) per person covers all expenses (including air fare, board fees, waterproof bags for gear, sleeping bags, etc.), and all meals. The trip is limited to 25 participants.

ADDITIONAL TOUR GEMS SLATED FOR 1984

- ☞ China and Tibet
- ☞ Kenya
- ☞ Peru
- ☞ England's Old Inns, Old Homes, Old Castles, and Old Gardens.

For additional information on any tour, please call Tours Manager Dorothy Roder at 322-8862 or write Field Museum Tours, Roosevelt Road at Lake Shore Drive, Chicago, IL 60605.



201
EDITH FLEMING

Black Folk Art in America: 1930-1980

April 14-July 15

April

14, Saturday, 2:00pm — **"What Is Folk Art?: Symposium"**
Panel: Lynda Roscoe Hartigan, Phyllis Kind, James Parker, Sterling Stuckey; moderator: Richard Powell

28, Saturday, 2:00pm — **Lecture: "Indelible Icons: The Black Atlantic Visual Tradition"**
by Robert Farris Thompson, professor of art history, Yale University

May

5, Saturday, 2:00pm — **Lecture: "The Origins and Development of Black American Folk Art"**
by Regenia Perry, professor of art history, Virginia Commonwealth University

6, Sunday, 2:00pm — **Performance: "Gospel Music: Spirit of the People"**
by 180 choir members of Trinity United Church of Christ of Chicago

13, Sunday, 2:00pm — **Performance: "A Teller of Tall Tales, Jack Tales and Ghost Tales"**
by Jackie Torrence, Granite Quarry, N.C.

19, Saturday, 2:00pm — **Lecture: "Memory and Sense of Place in Black Folk Art"**
by William Ferris, director, Center for the Study of Southern Culture, University of Mississippi

20, Sunday, 2:00pm — **Performance: "Blues Chicago Style"**
by Chicago musicians; moderators: Amy and Jim O'Neal, editors of *Living Blues*, journal of the black American blues tradition

June

3, Sunday, 2:00pm — **Performance: "West African Rhythms"**
by Mandingo Griot Society of Chicago

17, Sunday, 2:00pm — **Performance: "Adventures in Rhythm and Song,"**
by Ella Jenkins, Chicago folk singer

23, Saturday, 2:00pm — **Performance: "Africa's Gift to the World,"**
by Darlene Blackburn Dance Troupe, Chicago

"Fish," painted wood and metal sculpture by Leslie Payne, 13 x 45½ x 7½", 1970s, on view in exhibit "Black Folk Art in America 1930-1980," April 14 through July 15.

FIELD MUSEUM OF NATURAL HISTORY BULLETIN

May 1984

African Insights: Sources for Afro-American Art and Culture exhibit opens April 29

Black Folk Art Lectures: April 28, May 5, 19

Family Feature: Black Folk Tales by Jackie Torrence, May 13

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CONTENTS

May, 1984
Volume 55, Number 5

May Events at Field Museum 3

African and Afro-American Art: Call and Response 5
by Richard J. Powell, guest curator, Department of Anthropology

Field Museum Tours 26

COVER

Hammock (detail), made by the Sherbro or Mende people of Sierra Leone and woven of dyed and natural cotton. Late 19th or early 20th century. The piece was collected in Sierra Leone in 1901 and acquired by Field Museum in 1929. Cat. 175957. A photo of the entire piece may be seen on page 5. It will also be on view in Hall 9 from April 29 through December 31 as part of the exhibit "African Insights: Sources for Afro-American Art and Culture." See pages 5-25. Photo by Diane Alexander-White. N109326.

Eskimo Art and Culture

comprising two exhibits:
"Inua: Spirit World of the Bering Sea Eskimo"
and
"Grasp Tight the Old Ways:
The Klamer Family Collection of Inuit Art"
continues on view through May 27

Events

Black Folk Art Programs

These programs are designed to complement the special exhibit "Black Folk Art in America 1930-1980" and are funded in part by a grant from the National Endowment for the Humanities, a federal agency.

Fees are nonrefundable. Please use coupon to order tickets. For further information please call (312) 322-8854.

Black Folk Art Lectures
"Origins and Development of Black American Folk Art"
Regenia A. Perry, Professor of Art History, Virginia Commonwealth University
Saturday, May 5, 2:00pm; James Simpson Theatre, West Entrance

The earliest surviving examples of black American folk art include pottery, quilts, wood carving, basketry, iron work, and painting. Dr. Perry traces the development of this art through the 18th, 19th, and 20th centuries, explaining the remarkable persistence of certain "Africanisms" throughout the course of black American folk art history. Dr. Perry is an avid collector of black folk art and is author of the essay "Origins and Development of Black American Folk Art," in the exhibit catalog *Black Folk Art in America 1930-1980.*

Tickets: $5.00 (Members: $3.00).

"Memory and Sense of Place in Black Folk Art"
William Ferris, director, Center for the Study of Southern Culture
Saturday, May 19, 2:00pm; James Simpson Theatre, West Entrance

Family, region, and place influenced traditional African artists, and continue to influence the black American folk artist today. William Ferris looks at the contributions of black culture to the American experience, focusing on folk artists of the rural South. Located on the campus of the University of Mississippi, The Center for the Study of Southern Culture is a clearinghouse for information on regional studies of southern culture. As a folklorist who talks to the folk as well as studying their artifacts, Dr. Ferris has found Mississippi a vital research area.

Tickets: $5.00 (Members: $3.00).
Please use coupon to order tickets. For further information please call (312) 322-8854.

Gospel Music: *Spirit of the People*
Sanctuary Choir of Trinity United Church of Christ and members of the Jewel McLaurin Dance Company
Sunday, May 6, 2:00pm; Stanley Field Hall

"The spiritual is the community in rhythm, swinging to the movement of life." Over 150 members of the Sanctuary Choir of Trinity United Church of Christ present a musical program that explores the origins and evolution of black religious music. This performance illustrates with song and dance the slave hunt, capture, and ultimate departure of ships to the Americas, life working the fields of the South, and the celebration of religion in black churches today. The choir performs African chants, spirituals composed while working in the fields, and traditional and contemporary gospel songs, including calypso, samba, and reggae rhythms. The children's choir of Trinity United Church of Christ accompanies the Sanctuary Choir on selected pieces. This performance is free with Museum admission and tickets are not required.

Blues: Chicago Style
***Moderated by Jim and Amy O'Neal, editors of* Living Blues**
Sunday, May 20, 2:00pm; James Simpson Theatre, West Entrance

"Well the blues ain't nothing but a good man feeling bad just sitting down thinking about the good times he once had," from "Goin' Away Baby," by Jim Brewer.

It is generally agreed that Chicago is the blues capital of the world. No other city has so much blues activity or so many hot players on the local scene. Join us for an afternoon of blues that traces the history of this Chicago phenomenon.

With: Jim Brewer, *acoustic blues guitarist*
Eddie Taylor Blues Band, *traditional blues*
Jimmy Johnson Band, *contemporary blues*

Tickets: $5.00 (Members: $3.00)

Black Folk Art: Film Series

A special program of film has been designed to accompany the exhibition "Black Folk Art in America: 1930-1980." Films are screened on Saturdays in May and June, beginning at 1:00pm. Film notes are available. These films are free with Museum admission, and tickets are not required.

May 5: "Sermon's in Wood" (27m)
"Nellie's Playhouse" (14m)
May 12: "Always for Pleasure" (58m)
May 19: "Two Black Churches" (20m)
"Possum O Possum" (28m)
May 26: "The Performed Word" (58m)

Family Feature

"Jack Tales, Ghost Tales, and Tall Tales"
with Jackie Torrence, the Story Lady, Granite Quarry, North Carolina.
Sunday, May 13, 2:00pm, Stanley Field Hall

Young and old alike are held spellbound as Jackie Torrence spins her Jack Tales, Ghost Tales, and Tall Tales. The telling of tall tales and legends was formerly a dying folk tradition, but today it is experiencing a revival all over the country, thanks to storytellers like Jackie Torrence. Jackie is saving an important part of our heritage . . . and the result is a good time for all!

Her stories transfix the audience, immobilizing them as if they were frozen under a magician's wand. With ex-

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Events

CONTINUED FROM PAGE 3

pressive hands and a rich resonant voice she becomes in turn, a young girl, a croaking frog, and a demon snake. When her tale is told, spellbound listeners shake themselves and discover they are breathless.

Settle down to hear an afternoon of stories told by one who loves them all—the story, the people, and the characters she shares. This program is free with Museum admission, and tickets are not required.

May Weekend Programs

Each Saturday and Sunday you are invited to explore the world of natural history at Field Museum. Free tours, demonstrations, and films related to ongoing exhibits at the Museum are designed for families and adults. Listed below are only a few of the numerous activities available each weekend. Check the *Weekend Passport* upon arrival for the complete schedule and program locations. The programs are partially supported by a grant from the Illinois Arts Council.

May 5 1:00pm ***Ancient Egyptians.*** Examine the lives of the pharaohs and the Egyptian people, from Predynastic times to Cleopatra. Explore their culture and beliefs, from daily life to death and mummification.

1:30pm ***Tibet Today.*** Slide lecture shows Lhasa and other cities and towns now open to tourists, as well as Tibetan refugees who have carried their religion into the mountainous areas surrounding this ancient religious center.

2:30pm ***Himalayan Journey: A Faith in Exile.*** Slide lecture focuses upon the strongholds of Tibetan refugees in India: Dharamasla (home of the Dalai Lama), Darjeeling, and Sikkim.

6 12:30pm ***Museum Safari.*** Seek out shrunken heads from the Amazon, mummies from ancient Egypt, and African animals.

12 11:30am ***Ancient Egypt.*** Explore the traditions of ancient Egypt from everyday life to myths and mummies.

13 12:30pm ***Welcome to the Field.*** Enjoy a sampling of our most significant exhibits as you explore Field Museum.

19 2:00pm ***Malvina Hoffman: Portraits in Bronze.*** Discover the origins of the magnificent bronze works lining the halls of Field Museum. Film and slide lecture examines the life and works of Malvina Hoffman, concentrating on the Portraits of Mankind collection.

20 12:30pm ***Museum Safari.*** Seek out shrunken heads from the Amazon, mummies from ancient Egypt, and African animals.

26 1:00pm ***Red Land/Black Land.*** Examine the geography of the Nile Valley, and its effect on the life style of the pharaohs, religious practices of the priests, and the reason for mummification.

27 12:30 ***Welcome to the Field.*** Enjoy a sampling of our most significant exhibits as you explore Field Museum.

These weekend programs are free with Museum admission and tickets are not required.

Coming Next Month

"West African Rhythms"
The Mandingo Griot Society and Foday Musa Suso
Sunday, June 3, 2:00pm, James Simpson Theatre

Join us for an afternoon of West African music blending Mandingo traditional songs and original compositions.

Tickets: $6.00 (Members: $4.00)

Registration

Please complete coupon for your program selection and any other special events. Complete all requested information on the application and include section number where appropriate. If your request is received less than one week before program, tickets will be held in your name at West Entrance box office until one-half hour before event. Please make checks payable to Field Museum. Tickets will be mailed on receipt of check. Refunds will be made only if program is sold out.

Program Title	Member Tickets #Requested	Nonmember Tickets #Requested	Total Tickets #Requested	Amount Enclosed
			Total	

Name

Street

City State Zip

Telephone Daytime Evening

Have you enclosed your self-addressed stamped envelope?

For Office Use:

Date Received **Date Returned**

Return complete ticket application with a self-addressed stamped envelope to:

Public Programs: Department of Education
Field Museum of Natural History
Roosevelt Road at Lake Shore Drive
Chicago, IL 60605-2497

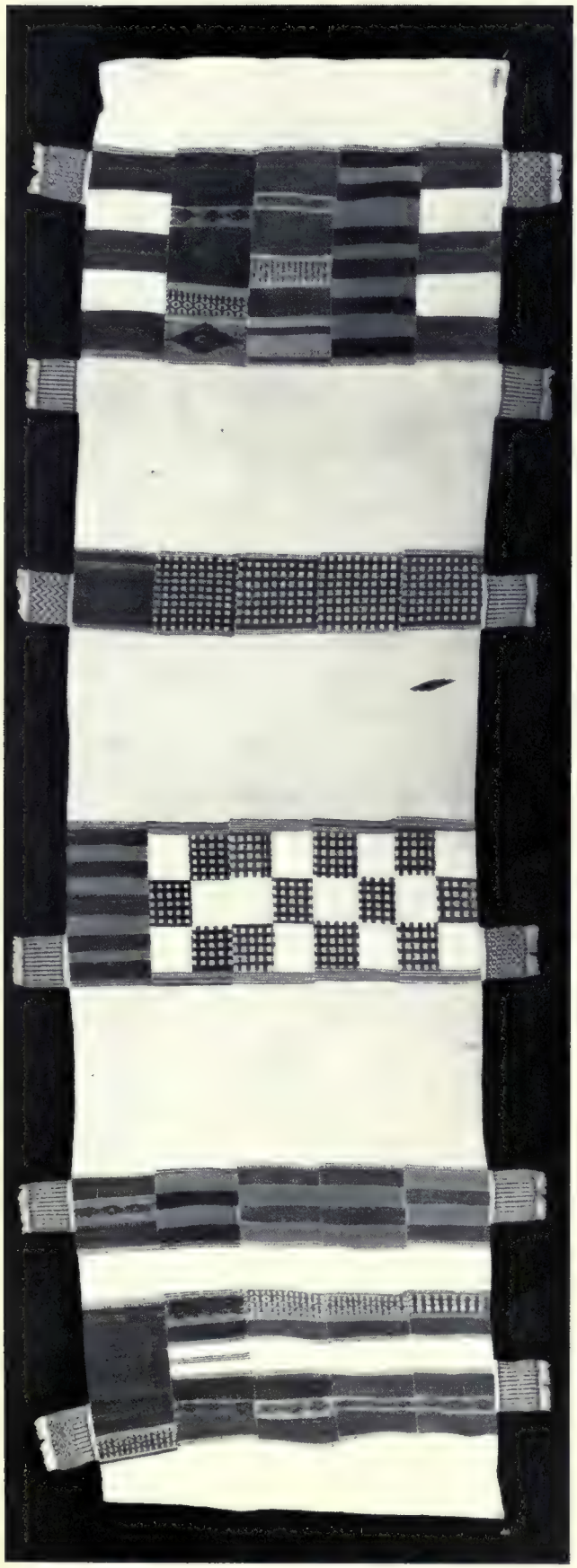

Fig. 1. *Hammock.* Sherbro or Mende, Sierra Leone. Cotton, dyed and natural. Late 19th/early 20th century. Field Museum collection, cat. 175957, N109326. Photo by Diane Alexander White.

African and Afro-American Art: Call and Response

by RICHARD J. POWELL
guest curator,
African Insights: Sources for Afro-American Art and Culture

I was astonished to see women ... do a sort of weaving, circular motion with their bodies, a kind of queer shuffling dance which expressed their joy in a quiet, physical manner. It was as if they were talking with the movements of their legs, arms, necks, and torsos; as if words were no longer adequate as a means of communication; as if sounds could no longer approximate their feelings; as if only the total movement of their entire bodies could indicate in some measure their acquiescence, their surrender, their approval.

And then I remembered: I'd seen these same, snakelike, veering dances before ... Where? Oh, God, yes; in America, in storefront churches, in Holy Roller Tabernacles, in God's Temples, in unpainted wooden prayer-meeting houses on the plantations of the Deep South ... How could that be?

—Richard Wright[1]

Following a 1953 tour of Ghana, Afro-American novelist and essayist Richard Wright described his first impressions of his "ancestral homeland" in the book *Black Power.*

This essay was written as an accompanying text for the exhibition, *African Insights: Sources for Afro-American Art and Culture*, on view at the Field Museum of Natural History from April 29 until December 31, 1984. I heartily thank the many organizations and individuals who helped to realize this project, and who guided an inquiring scholar through the storerooms, archives, and mindsets of black creativity: the staff at the Field Museum of Natural History, especially the Anthropology, Education, and Exhibition Departments; the Illinois Humanities Council; the Dusable Museum of African American History; Richard Hunt; and Robert Farris Thompson.—R.J.P.

© 1984 Field Museum of Natural History

Fig. 2. Lewis Miller, *Virginia Sketchbook, 1853: "Spinning wool" and "Lynchburg-negro dance*, ca. 1853. Watercolor, ink, and pencil on paper. Abby Aldrich Rockefeller Folk Art Center, Williamsburg, Va.

Wright was taken aback by the differences *and* similarities between Africans and black Americans. The *shared* characteristics were particularly puzzling for Wright, since he had long assumed that the centuries which had transpired and the traumatic experience of slavery obliterated any possibilities for African "survivals" in America. However, his face-to-face encounter with West African dance, gestures, and cultural patterns recalled similar traditions in the United States.

Wright's acknowledgement of "some kind of link," along with the same realization by anthropologists and historians form the ideological core for the Field Museum of Natural History's exhibition *African Insights: Sources for Afro-American Art and Culture.*[2] The connections between various African peoples and their Afro-American descendants are often not immediately apparent. Layers of time, as well as cross-cultural influences, refashion African expressions into American statements. But the indelible mark of several West African civilizations continues through time and over the dominant culture, expressing itself in an outlook and style that is essentially "Black Atlantic." The arts and cultures that exist along Africa's west coast—from Senegal's Cape Verde to just below the mouth of the Congo River—are reinvented among black populations in South America, the Caribbean, and the United States with striking results.

This art survey, drawn largely from the Field Museum's African collection, closely examines the African cultures that contributed to a black presence in the Americas, especially in the United States. The major cultural areas of Africa represented in North America-bound slave ships include Kongo and Angolan peoples; Africans from the Niger Delta area (predominantly Igbo and Cross River groups); Akan captives from the "Gold Coast" (present day Ghana); peoples from the West Atlantic and Mande-influenced regions of Senegambia, Guinea, Sierra Leone, and parts of Mali; and "Slave Coast" inhabitants: Ewe from Togo, Fon from the Republic of Benin (formerly Dahomey) and Yoruba from Southwestern Nigeria.[3] These ethnic groups, as represented in the assembled artworks and cultural artifacts, carried genetic and aesthetic information across the Atlantic into the sewing rooms, plantations, and ateliers of black America.

One vivid example of aesthetic information from West Africa stands out in a Mande-influenced textile from the Mende or Sherbro people (cover photo and figure 1). Collected in Sierra Leone in 1901 and acquired by the Field Museum in 1929, this hammock consists of five long strips of hand-spun cotton, woven and sewn together with a subtle, staggered design. The trademark of these heavyweight "country cloths," is the conscious manipulation of corresponding and contrasting patterns, via the use of natural or dyed yarns, weft-faced weaves, and supplementary tapestry techniques. Though a "broad-loom" width is the objective in sewing the strips together, "breaks" in the prevailing design suggest that accentuation and occasional suspension of the design "beat" is equally important.[4]

That African-born and African-descended slaves were encouraged in textile-related crafts is attested to in countless slave narratives and surviving visual documents. An 1853 drawing from the sketchbook of Lewis Miller, a German-American artist (fig. 2), illustrates, among other things, the spinning of wool by one of Virginia's slave population. Although black American artisans had access to Western European looms and weaving techniques, they frequently chose West African design units and color combinations in the manufacturing of cloth for home use.[5] Very few slave-era textiles have survived to the present day, but modern examples of traditional, Afro-American cloth art demonstrate the persistence of an African approach to textiles. Black American "patchwork" artistry—borne out of economic necessity *and* visual ingenuity—is represented in a classic, "Spider Leg" quilt (fig. 3) by Mississippi artist Pecolia Warner.[6] The narrow (*i.e.*, "spider leg" width) strips of cloth are sewn together in alternating (dark/light and patterned/solid) schemes that hearken back to visual ancestors like the Sierra Leonean "country cloth."

Perhaps the most well-known African ancestor to traditional black American arts and crafts is the coiled-grass basket. On both sides of the Atlantic these baskets serve in many capacities, functioning as food containers, storage bins, and even head gear. But it is in the role of agricultural tool that African and Afro-American coiled-grass baskets especially show a shared form and function.[7]

When British settlers discovered that colonial

Fig. 3. Pecolia Warner, *"Spider Leg" Quilt*, ca. 1970. Cotton. Center for Southern Folklore, Memphis, Tenn. Photo by Diane Alexander White.

South Carolina and Georgia had the climate, terrain, and natural vegetation to sustain large scale rice cultivation, it wasn't very long before the Atlantic slave trade was escalated, and thousands of West Africans were being shipped into North America as cheap labor. These African slaves, many of whom were already knowledgeable about growing rice, also brought to America the know-how for making the wide and shallow "rice fanner" (fig. 4), an essential tool for the tropical and semitropical farmer.[8]

Wilfred Hambly, former curator of ethnography at the Field Museum, collected several coiled-grass baskets during an expedition to Angola in 1929.[9] In one of the photographs from that expedition (fig. 5), an Ovimbundu woman is shown making one of these baskets. Her low-to-the-ground, seated position, and her obvious dexterity in coiling the varied lengths of grass mirror the work procedures and woven products of her South Carolina Sea Island sister (fig. 4), shown here in a turn-of-the-century photograph.

Of course, other New World countries that developed under plantation economies also reflect the cultural legacies of Africa. In contrast to the statistics for the United States, the overall numbers for slave importations into Cuba, Haiti, Dominican Republic, Suriname, and Brazil are much higher, and extend over a longer period of time. These combined factors result in aspects of Caribbean and South American life that are much closer to West African societies than the cultural patterns of blacks in the United States.[10]

A classic example of this cultural fidelity to Africa is witnessed in the art and culture of Suriname. During the 17th and 18th centuries, this small area on the northeastern coast of South America was considered one of the most profitable sugar-producing colonies in the Western Hemisphere. Consequently, 5.5 percent of all African slaves imported into the Americas were shipped into the "Guianas" (present-day Guyana, Suriname, and French Guiana).[11] Slaves frequently escaped from the coastal plantations and sought refuge (and companionship with other escapees, or "Maroons") in the heavily forested and water-coursed interior. These bands of self-liberated men and women, armed with the traditions of their African past, developed communities, religious activities, languages, culinary arts, and other folkways that relied strongly on selected African correspondents.[12]

A comb attributed to the Saramaka people of Suriname (fig. 6) features a central floral pattern, an overlapping and joined ribbon design, engraved areas, and "owl" and "jaguar" eye openings.[13] These motifs and the carved openwork convey symbolic elements and illustrate the use of visual metaphors in Maroon abstract design. One might correlate the aesthetic sensibilities that govern this Saramaka comb with those that operate in the combs of Southeastern Ghana (figs. 7 and 8). Also utilizing intersecting bands, engraved patterns, and symbolic animal forms, combs by the Akan peoples of Ghana are virtual lexicons of illustrated proverbs and traditional beliefs. Engraved on one side of the Akan comb are a rooster, a hen, the sun, a crescent moon, and a "sacred heart" (borrowed from Christian iconography): all symbols of love.[14] The meaning of the engraved fish on the opposite side of the lower handle defies immediate interpretation, but it possibly refers to a local saying, or to a personal symbol of either the carver or the recipient of the comb.

As gifts from men to their wives, fiancees, sisters, or mothers, the Akan and Saramaka combs are tokens of esteem out of two societies that are singularly preoccupied with aesthetic issues. From the sensuous, organic forms of the Saramaka comb, to the round-headed symbol of fecundity and beauty on the Akan comb, the visual ideal centers on life-giving forces.

Fig. 4. South Carolina woman fanning rice, from *Outlook* magazine, Oct. 24, 1908. N83619A.

Fig. 5 Ovimbundu woman making coiled-grass basket, *ca.* 1929-30. N67871.

For many New World blacks the only African traditions that could be maintained without chastisement from their white owners were *conceptual* ones — closely-held beliefs, community mores, and the *manner* in which work and recreation were performed.[15] Unknown to the master, the "missus," and the plantation overseer were those inherently African ways that slaves prayed among their own, conducted their own systems of social interaction, mourned their own dead, dressed, cooked, made music, and danced. That the canons of an African aesthetic could be called upon across the boundaries of a specific medium, via these deep-seated concepts, is attested to in numerous examples of recent black

Fig. 6. (left). *Comb.* Afro-American, Suriname (Saramaka). Wood. 20th century. Field Museum collection, cat. 191682, N109323. Figs. 7, 8 (center and right, representing front and back). *Comb.* Akan, Ghana. Wood, beads. 20th century. Field Museum collection, cat. 221468, N109285 and N109285A. Photos by Diane Alexander White.

American choreography, music, literature, and visual art.

A concept that addresses this cultural extension is the important standing that women maintain in society. Notwithstanding a system of rigidly defined sex roles, many West African women enjoy economic independence from their husbands, and the related decision-making powers, social prestige, and influence over fellow community members.[16] A standing female figure (fig. 9), collected in southwestern Nigeria before 1893, embodies much of this West African-based "feminism" in its realistically-designed head tie, frozen facial expression, erect posture, and overall characterization. Although it is difficult to determine which cult this shrine image was used for by the Yoruba, its confidence and physical presence loudly proclaims female assertiveness. In a different vein, the Ibibio of southeastern Nigeria portray a youthful and physically striking woman (fig. 10), on a carved headdress from the turn of the century. Possibly depicting one of the candidates for female initiation rites, headdresses like this one were used in marionette-like performances by troupes of dancers and actors.[17] The Yoruba and Ibibio representations of vital, power-wielding women both have a distant, though conceptually close counterpart in contemporary, Afro-American images of womanhood. For instance, artist Inez Nathaniel-Walker's drawings of black women (fig. 11) unconsciously pick up on these West African traits of female dynamism. Nathaniel-Walker's emphasis on surface activity, an elaborate hairstyle, and a searing expression in *Woman and Purple Curtain* transforms her subject into aggression itself, but like the Yoruba and Ibibio sculptures, she tempers this aggression with beauty and potentiality.[18]

Another concept that crossed the Atlantic is the metaphoric use of snakes. The Fon people of the Republic of Benin (formerly the Kingdom of Dahomey) encorporate the benevolent snake, or *Dan,* in many of their religious ceremonies, believing that the python's ability to traverse land and watery realm entitles it to special deference.[19] Among several categories of Fon charms, or *gbo,* is a hammered piece of iron shaped like a snake (fig. 12) and used by travelers as a portable altar.[20] *Dan's* capacity for ensuring health, prosperity, and good will is harnessed both ritually and sculpturally in this concrete desire for mediation. At

Fig. 9. *Female Figure.* Yoruba, Awori area, Nigeria. Wood, pigment. Late 19th century. Field Museum collection, cat. 28545, N109325. Photo by Diane Alexander White.

Fig. 10. *Headdress.* Ibibio, Nigeria. Wood, basketry, pigment, mirrors. Late 19th century. Field Museum collection, cat. 25036, N98087.

least fifty years later and across the Atlantic Ocean in World War II-era Alabama, artist Bill Traylor utilizes snake imagery in a similar fashion. In an enigmatic drawing by Traylor (fig. 13), the undulating movements of a snake are doubled, and fixed to a central horizontal line. A gesturing man, a woman supported by a walking stick, and a gravity-defying cat (all rendered in silhouettes) flank this snake construction. This collection of seemingly disparate elements, like other works by Bill Traylor, suggest observed and imagined phenomena. Possibly referring to an old Afro-Alabaman belief about encountering snakes along the road,[21] Traylor's drawing dialogues with the Dahomean image with an allegiance, and proffers that Fon influences may have entered the United States via the Caribbean-Louisiana migration route.[22]

In regard to specific African influences in the United States, an overwhelming amount of evidence points towards Kongo and Kongo-related peoples as a major cultural factor. Although historians differ on the approximate number of Kongo peoples imported in total, there is a consensus that in the final "boom" years of the legal U.S. slave trade (*ca.* 1783 through 1807), the slavers received most of their human cargo from the southernmost part of the trading region: present day People's Republic of the Congo, Zaire, and Angola. The large number of imported Kongo peoples (estimated between one-third and one-fourth of all Africans imported into the U.S.),[24] and their status as the last, en-masse, cultural group of Africans to enter the United States in these genesis years for Afro-America, warrant a close consideration of Kongo culture in this study.

Also central to any discussion about traditional Afro-America is the acknowledging of social practices and beliefs that sustained black Americans in the midst of an oppressive system. Self-assurance during those years of enslavement, reconstruction, and disenfranchisement came about as a result of an increased awareness of one's history and of one's spirituality. This double-barreled source for inner freedom and power expresses itself in slave testimonies, statements concerning Afro-American religious vocation, and descriptions of various leaders (ministers, midwives, and other community therapists).

The famous Afro-American walking cane (fig. 14) by the mid-nineteenth-century carver Henry Gudgell epitomizes this Kongo-influenced will to-

Fig. 11. Inez Nathaniel-Walker, *Woman in Purple Curtain*, 1975. Pencil and colored pencil on paper. Phyllis Kind Gallery, New York and Chicago.

Fig. 12. *Snake charm (gbo).* Fon, Republic of Benin. Iron. Late 19th century. Field Museum collection, cat. 28539, N109324. Photo by Diane Alexander White.

wards self-confidence and knowledge. Carved reptilian motifs, along with plant, human (fig. 15), and abstract elements of decoration, join forces in communicating a message to the owner of the cane and to the larger world. What this message generally addresses is the idea of prestige and power (as represented in the swirling finial) being a God-given state, and that the healing potential (*i.e.*, the medicinal leaf)

Fig. 13. Bill Traylor, *Snake at the Crossroads*, ca. 1939-42. Drawing. Private collection, courtesy Carl Hammer Gallery, Chicago. Photo by Cheri Eisenberg.

Fig. 14. (left). Henry Gudgell, *Carved Cane with Figural Reliefs*, ca. 1863. Wood, pigment. Yale University Art Gallery, New Haven, Conn.
Fig. 15. (right). Detail of cane. Both photos by Joseph Szaszfai.

Fig. 16. *Standing Male Figure with Staff.* Kongo, Zaire. Wood, pigment, glass. Late 19th century. Field Museum collection, cat. 43906, N102999.

Fig. 17 *Staff with Figurated Top.* Coastal Kongo, Congo or Cabinda. Wood, pigment. Late 19th century. Field Museum collection, cat. 28229, negative N102996 (detail).

Fig. 18. (left). *Carved Cane.* Afro-American, United States (Cherry Valley, Ark.). Wood, rhinestone inlay, cloth. Ca. 1916. Lent by Dr. Adell Patton, Jr., Courtesy Yale University Art Gallery, New Haven, Conn.
Fig. 19. (right). Detail of cane. Photos by Joseph Szaszfai.

Fig. 20. *Figurated Pipe.* Coastal Kongo, Congo or Cabinda. Wood, leather. 19th century. Field Museum collection, cat. 210465, N109214. Photo by Fleur Hales Testa.

of such an appointment is contingent with communication between this world (symbolized by the man) and the spirit world (symbolized by the snake, turtle, and lizard).[24] This panoply of carved symbolism, envisioned by a black American artisan who was probably no more than several generations removed from Africa, recalls its Kongo ancestors with remarkable visual recollection. In a Kongo sculpture of a man balancing a walking cane with both hands (fig. 16), the same concept of high-ranking status and mediation are encoded in the cane's serpentine carving and in the sculpture's air of ritual readiness.[25]

The moral height that this 19th-century Kongo figure ascends to has a Machiavellian counterpart in another Kongo figure (fig. 17), carved on top of a wooden staff, and also dating from the 19th century. Depicting a Dutch seafarer, the figure sports a mariner's cap, moustache, jacket, trousers, and wooden shoes. In much of the Kongo art that hails from the colonial period, or from the coastal regions where contacts with European traders were frequent, carvers use the image of the European as a symbol of material wealth and influence.[26]

A figure also crowns an early 20th-century walking stick from Cherry Valley, Arkansas (fig. 18). Standing stoically over a carved, winding staff, the

Fig. 21. *Figure Holding Bowl.* Afro-American, United States (Fayetteville, N.Y.). Carved Pine. Ca. 1860. Abby Aldrich Rockefeller Folk Art Center, Williamsburg, Va.

Fig. 22. Simon Sparrow, *Untitled*, 1983. Mixed media assemblage on wood. Carl Hammer Gallery, Chicago. Photo by Cheri Eisenberg.

Fig. 23 *Oath-Taking and Healing Figure (Nkisi N'Kondi).* Yombe, Zaire. Wood, clay, fiber, metal, pigment, cowrie shell. Late 19th century. Field Museum collection, cat. 91300, N109327. Fig. 24 (opposite) shows detail N109329. Photos by Diane Alexander White.

Fig. 25. Doris Ulmann, *Decorated Grave in the Carolina Sea Islands*, ca. 1930. Photo courtesy William Clift.

suited male figure incarnates his own version of eminence. Holding a book (possibly a bible) in his right hand, while his left hand is hidden in his jacket pocket (fig. 19), he recalls the contained gestures of the Kongo "Dutchman." But unlike the representation of the Dutchman-as-economic/political might, this Afro-American walking stick equates the authority of its upper figure with secular and/or spiritual insight.

The Kongo walking stick came to Chicago in 1893, when collector and dealer Carl Hagenbeck sold a large number of artifacts to the Columbian Museum of Chicago, now known as the Field Museum of Natural History.[27] Subsequent acquisitions of Kongo art have expanded the museum's holdings from this region of Africa, making extensive museum-based research into Kongo aesthetics and material culture possible. One of those subsequent Kongo acquisitions is a carved wooden pipe (fig. 20), a gift to the Field Museum from the celebrated, London collection of Captain A. W. F. Fuller.[28] In addition to classic, Kongo designs encircling the pipe, a rapacious bird appears on the stem, and a male figure straddles and clutches the drumlike bowl. Though essentially conceived in the proportions of a Western-style smoking pipe, the figurative elements and implied gestures of generosity and contemplation push this implement into the parameters of Kongo ethics and cosmology.[29] The same sense of meditative giving filters through the placid expression of an Afro-American carving from Fayetteville, New York, circa 1860 (fig. 21). Purportedly done as a token of appreciation by a fugitive

slave enroute to freedom, this carving of a seated man holding a vessel conveys a reciprocity that is also very much a part of the Kongo pipe's directive—that man must ultimately give of himself in this world.

Aspects of African religions, such as the presence of vital forces throughout the universe, an intimate and personal Supreme Being, or the inevitable retribution for actions both good and bad,[30] gave African captives a basis for embracing those aspects of Christianity that also promoted these ideals. The syncretic nature of traditional black religion also allowed for African symbols to become Christian ones—a fact of creolization that explicitly shows itself in the Afro-Catholic shrines of Brazil, Haiti, and Cuba. But this conversion was not limited to the Catholic Americas, as evidenced in the ritual and style of older black Protestant churches in the American South.[31]

Afro-U.S. religion reveals its more expressive side in a recent mixed media assemblage by Wisconsin artist Simon Sparrow (fig. 22). Consisting of old costume jewelry, buttons, beads, and various bric-a-brac, all glued on a wooden board in a carefully-conceived format, Sparrow's creation indulges in visual swoops and collaged shouts that rival the gospel artistry of an Alex Bradford or Clara Ward.[32] Sparrow's particular attention to symbolic accretions —as seen in a cross and "spirit hound" rendered in glitter and pearls, or in the strategic placement of a huge shell—is an aesthetic impulse that most likely draws on his New Bern, North Carolina roots, and on that region's cultural debt to Kongo-influenced cemetery ornamentation and charm-making.[33]

One of the finest examples of a sculpted Kongo charm, or *Nkisi N'Kondi* (fig. 23), illustrates the visual ancestor for Sparrow's meaningful but elusive assemblage. Collected in Bas-Zaire and acquired for the Field Museum in 1907, this oath-taking and healing figure carries in its whole being the basic tenets of Kongo beliefs and judiciary law.[34] Clients present their arguments, illnesses, and various problems before a ritual expert, who in turn, addresses the solutions, remedies, and oaths to the *Nkisi N'Kondi*. Each nail, blade, and screw represents an important matter that was resolved by hammering the iron staves into the figure. The massive swelling in the abdomen symbolizes a negative force that can only be brought under control with the moral righteousness and entrée of a shell or piece of glass: metaphors for an eternal, parallel world. The shimmering bits of jewelry and large white seashell in Simon Sparrow's work is echoed on the shell- and tinsel-decorated graves from cemeteries in coastal Carolina and Georgia communities (fig. 25). From a related use of shells, porcelain, and/or reflecting glass in Kongo charms and graveyards, to an overall Black Atlantic "collage sensibility," Simon Sparrow's untitled opus to creativity and the Creator displays all of the necessary accumulative powers through what Robert Farris Thompson calls the "Flash of the Spirit."[35] Just as the *Nkisi N'Kondi* is a glorification of the judge, healer, and policing agent, so too is Sparrow's assemblage an homage to the previous owners (and ultimate Owner) of the rings, chains, necklaces, and other gems of the universe.

African Insights: Sources for Afro-American Art and Culture

will be on view in Gallery 9
April 29 through December 31, 1984

The African and Afro-American objects discussed in this essay, and the rest of the visual statements from *African Insights: Sources for Afro-American Art and Culture* can be viewed as a gathering of past and present lives, carved in history, and based on the needs of village associations, royal artisans, uprooted slaves, inspired freedmen, and ingenious men and women. This exhibition not only represents an art historical case of aesthetic giving and taking, but also the timeless phenomenon of turning idea, act, and impulse into concrete philosophy: concepts that are held up, displayed, worn, danced, and passed down from generation to generation. Though the context for singling out selected, Black Atlantic images is intentionally didactic, the objects and the accompanying stories of cultural transmission make the looking and learning process a gratifying, trans-Atlantic sojourn: a *rite-de-passage* available to one and all. FM

NOTES

1. Richard Wright, *Black Power* (New York: Harper and Brothers, 1954), p.56.
2. Of course, Richard Wright's statement is a *personal* observation on African and Afro-American linkages. One of the earliest, and perhaps the most controversial scholarly investigation into this subject is Melville J. Herskovits, *The Myth of the Negro Past* (New York: Harper and Brothers, 1941). Though debated at the time of its publication, Herskovits's study of African influences in the New World has had reverberations on subsequent writers, most notably James A. Porter, "The Trans-Cultural Affinities of African Negro Art," in *Africa Seen by American Negroes*, ed. John A. Davis (Paris: Presense Africaine, 1958), pp. 119-130, and Robert Farris Thompson, "African Influences on the Art of the United States," in *Black Studies in the University*, eds. Armstead L. Robinson, Craig Foster, and Donald H. Ogilvie (New Haven: Yale University Press, 1969), pp. 122-170. Thompson's most recent book on trans-Atlantic art and culture, *Flash of the Spirit: African and Afro-American Art and Philosophy* (New York: Random House, 1983) provides contemporary readers with additional data that traces specific African traditions (Yoruba, Kongo, Dahomean, Mande, and Ejagham) to various New World communities.
3. The best source for the percentages and origins of African slaves in the Americas are Philip D. Curtin, *The Atlantic Slave Trade: A Census* (Madison: The University of Wisconsin Press, 1969), and James A. Rawley, *The Trans-Atlantic Slave Trade: A History* (New York: W.W. Norton and Company, 1981).
4. The "reading" of West African textiles as woven and dyed discourses on rhythm occurs in Roy Sieber, *African Textiles and Decorative Arts* (New York: The Museum of Modern Art, 1972), p. 190, and Robert Farris Thompson, *African Art in Motion* (Berkeley: University of California Press, 1974), pp. 10-13. Jules Staub discusses the looms, weaving techniques, and types of cloth among the Mende in *Beiträge zur Kenntnis der Materiellen Kultur der Mendi in der Sierra Leone* (Solothurn: Buchdruckerei Vogt-Schild AG., 1936), pp. 28-35. Still, another fine analysis of Mende textiles appears in John Picton and John Mack, *African Textiles* (London: The Trustees of The British Museum, 1979), pp. 103-106.
5. Dominic Parisi conducted a series of interviews with older black quilters in Eastern Kentucky during the summer of 1979. Among the many conclusion that were drawn from that study was the overwhelming preference among the quilters for a high contrast of colors: a basic canon for Western Sudanic textiles as well. *Conversations with Black Women who live and quilt in Eastern Kentucky*, unpublished manuscript by Dominic Parisi, 1979. Also see Pascal James Imperato, "Bamana and Malinke Covers and Blankets," *African Arts*, vol. 7, no. 3 (1974), pp.56-67, 91.
6. William Ferris, "Pecolia Warner, Quilt Maker," in *Afro-American Folk Art and Crafts*, ed. William Ferris (Boston: G.K. Hall and Company, 1982), pp. 98-108, and Maude Southwell Wahlman and Ella King Torrey, *Ten Afro-American Quilters* (University: The Center of the Study of Southern Culture/University of Mississippi, 1983) discuss Pecolia Warner's artistry in the context of classic, Afro-American quilt making. I am especially indebted to Maude Wahlman for bringing to my attention the exceptional Warner quilt (figure 3) presently in the collection of the Center for Southern Folklore, Memphis, Tennessee.
7. Mary Twining, "Harvesting and Heritage: A Comparison of Afro-American and African Basketry," *Southern Folklore Quarterly*, vol. 42 (1978), pp. 159-174.
8. The cultural impact of Senegambian, Windward coast, and Kongo/Angolan peoples on colonial South Carolina is addressed in Peter Wood's landmark book *Black Majority: Negroes in Colonial South Carolina from 1650 through the Stono Rebellion* (New York: W.W. Norton and Company, 1974).
9. Wilfred Hambly, *The Ovimbundu of Angola/Frederick H. Rawson Field Museum Ethnological Expedition to West Africa* (Chicago: Field Museum of Natural History,1934), pp. 169-172.
10. Herskovits, *op. cit.* and Pierre Verger, *Notes sur le culte des Orisa et Vodun a Bahia, la Baie de tous les saints, au Brésil et à l'ancienne Côte des esclaves en Afrique* (Dakar: IFAN, 1957).
11. Curtin, *op. cit.*, pp. 89-91.
12. Discussing the juncture between West African civilizations and an emerging Afro-American culture in Suriname, two anthropologists hold the opinion that the early Maroons "did share certain general cultural orientations that, from a broad comparative perspective, characterized West and Central African societies as a whole." Sally and Richard Price, *Afro-American Arts of the Suriname Rain Forest* (Berkeley: University of California Press, 1980), p. 196.
13. I thank Christopher Healy, who specializes in the art and culture of Suriname's Maroon populations, for sharing his expertise on this Saramaka comb.
14. The objects of much creative energy in Ghana, combs like this one are appreciated for their formal beauty and power to communicate, as discussed by Janet Adwoa Antiri in "Akan Combs," *African Arts*, vol. 8, no. 1 (Autumn 1974), pp. 32-35, and Herbert M. Cole and Doran H. Ross in *The Arts of Ghana* (Los Angeles: Museum of Cultural History/University of California, 1977), pp. 48-53.
15. Daniel J. Crowley, "Negro Folklore, An Africanist's View," *The Texas Quarterly*, vol. 5, no. 3 (Autumn 1962), p. 67.
16. For an in-depth study of the multiple roles that women play in traditional societies, see Judith Hoch-Smith and Anita Spring, eds. *Women in Ritual and Symbolic Roles* (New York: Plenum Press, 1978). The novels of two outstanding Nigerian writers, Flora Nwapa and Buchi Emecheta, also explore women's issues. Flora Nwapa, *Idu* (London: Heinemann Educational Books Ltd., 1970) and Buchi Emecheta, *The Slave Girl* (New York: G. Braziller, 1977).
17. John C. Messenger, "Ibibio Drama," *Africa*, vol. 41, no. 3 (1971), pp. 208-222.
18. A major area of research for art historian Sylvia A. Boone has been the perception of beauty in Africa and Afro-America. Conversations with Professor Boone, 1981-82, and the exhibition catalog by Roslyn A. Walker, *African Women/African Art* (New York: The African-American Institute, 1976) have greatly contributed to my understanding of this area.
19. For a thorough interpretation of Fon religion and society, see Melville J. Herskovits, *Dahomey, an Ancient West African Kingdom*, vols. I and II (Evanston: Northwestern University press, 1967). Discussions of snake imagery also appear in P. Mercier, "The Fon of Dahomey," in *African Worlds*, ed. Daryll Forde (London: Oxford University Press, 1954), pp.220-222, and Robert Farris Thompson, *Flash of the Spirit: African and Afro-American Art and Philosophy* (New York: Random House, 1983), pp. 176-179.
20. This small piece of iron, shaped like a snake and decorated with a brown feather, is inserted into the ground by the traveler. Libations of palm-oil, alcohol, red kola, and drinking water are made to it, and the ritual is completed with a prayer. Herskovits, *ibid.*, vol. II, p. 282. The iron snake and the related rituals of the Fon were brought to Haiti during the slave trade, as seen in the worship of snake deities throughout Haiti, and in the use of iron snakes in Vodun ceremonies. Alfred Metraux, *Voodoo in Haiti* (New York: Schocken Books, 1972).
21. "... crossing the road where a snake has crossed will give you a backache unless you turn around and walk backwards over the spot."—Newbell Niles Puckett, *Folk Beliefs of the Southern*

Negro (Chapel Hill: The University of North Carolina Press, 1926), p. 436. The connections between snakes, traveling, and one's physical state of well-being are not only observed in this old saying from Alabama, Bill Traylor's drawing, and in various Fon rituals, but among the Angolan peoples as well. Wilfred Hambly mentions carved snakes in divination, serpents as either good or bad omens, and the wearing of snake vertebrae as a cure for rheumatism. Hambly, *op. cit.*, pp. 138, 275, and 298.

22. Bill Traylor and Inez Nathaniel-Walker are discussed at length in Jane Livingston and John Beardsley, *Black Folk Art in America: 1930-1980* (Jackson: University Press of Mississippi/ Center for the Study of Southern Culture, 1982), pp. 138-145, 104-109. At the beginning of the nineteenth century, thousands of Cuban and Haitian immigrants poured into Louisiana. Though differing in race, caste, and class, these immigrants brought to North America their Caribbean traditions, many which were the products of strong, African influences. Samuel Wilson, *New Orleans Architecture, vol. IV: The Creole Faubourgs* (Gretna: Pelican Publishing Company, 1974), pp. 25-36, and H.E. Sterkx, *The Free Negro in Ante-Bellum Louisiana* (Rutherford: Fairleigh Dickinson University Press, 1972).

23. Philip Curtin, *op. cit.*, pp. 156-158, and Robert Farris Thompson and Joseph Cornet, *The Four Moments of the Sun: Kongo Art in Two Worlds* (Washington, D.C.: National Gallery of Art, 1981), pp. 147-151.

24. In a forthcoming work by Ramona Austin, the aesthetic effects of Kongo staffs are convincingly traced to figurated walking sticks and "conjuring" canes in the black United States. I am grateful to Ms. Austin for sharing her ideas about these canes during a conversation, 6 February 1984. The Gudgell cane was first mentioned and illustrated in James A. Porter, *Modern Negro Art* (New York: Dryden Press. 1943), pp. 27, 201. Robert Farris Thompson, "African Influences on the Art of the United States," *op. cit.*, discusses the Gudgell cane in the context of other early, Afro-American masterpieces.

25. A close comparison between this Kongo figure and a Kongo figure illustrated in Kurt Krieger, *Westafrikanische Plastik, I* (Berlin: Museum Für Volkerkunde, 1969), Pl. 187 and p. 91, suggest that one school, or even one carver created both works. This is very likely, since the collectors for the Berlin and Chicago figures traveled in the same area of Central Africa at about the same time.

26. For a discussion about depictions of Europeans in African art, see Phillip H. Lewis, "Primitive Artists look at Civilization," *Chicago Natural History Museum Bulletin*, vol. 32, no. 7 (July 1961), pp. 2-3, 8, and Roslyn A. Walker, *The Stranger Among Us* (Washington, D.C.: National Museum of African Art/ Smithsonian Institution, 1982).

27. The details concerning this transaction are found in the correspondence from Carl Hagenbeck's Zoological Arena and World's Museum, to the Columbian Museum of Chicago, Autumn 1893, Accession File 81, Anthropology Department, Field Museum of Natural History.

28. For a brief synopsis of Captain A.W. F. Fuller's career as a collector, see Philip J. C. Dark, *The Art of Benin: A Catalogue of an Exhibition of the A.W.F. Fuller and Chicago Natural History Museum Collections of Antiquities from Benin, Nigeria* (Chicago: Chicago Natural History Museum, 1962), pp. 1-2, 17-18.

29. Smoking in many African societies is looked upon as both recreational pasttime and ritual act. Wilfred Hambly recounts a legend on the origins of smoking from the Bushongo, a people who live to the east of the Bakongo:

"A man... astonished his tribesmen by producing a pipe from the trade goods brought from distant places. While smoking in the center of a curious circle, he proceeded to explain the value of tobacco by saying, "When you have had a quarrel with your brother, you may wish to kill him; sit down and smoke a pipe. By the time this is finished you will think that death is too great a punishment for your brother's offence, and you will decide to let him off with a thrashing. Relight your pipe and smoke on. As the smoke curls upward, you will think that a few harsh words would serve instead of blows. Light your pipe once more and, when the bowl is empty, you will ready to go to your brother and forgive him."

Berthold Laufer, Wilfred D. Hambly, and Ralph Linton, *Tobacco and its Use in Africa*, Leaflet 29 (Chicago: Field Museum of Natural History, 1930), p. 23. While one might consider the Field Museum pipe to be an aberrant, tourist item, based on its Western form and unusual figuration, other pipes from the Kongo area raise the spectre of an indigenous, figurated pipe tradition. For a similar pipe form from the Kongo area, see a Teke pipe from the Göteborg Museum, illustrated in Raoul Lehuard, *Statuaire du Stanley-pool* (Villier-le-Bel: Arts d'Afrique Noire, 1974), p. 171.

30. John S. Mbiti, *African Religions and Philosophy* (New York: Praeger, 1969), and Dominique Zahan, *The Religion, Spirituality, and Thought of Traditional Africa* (Chicago: The University of Chicago Press, 1979).

31. Rev. Joseph A. Brown brilliantly assesses the "Africanizing" process in "Voices Stirring the Waters: Reflections on the Religious Impulse of Afro-American Art" (M.A. thesis, Yale University, May 1983).

32. Concerning the seemingly excessive decoration of a Mobile, Alabama home, one anthropologist concluded that "... the feeling in back of such an act is that there can never be enough beauty, let alone too much." This point-of-view is also quite applicable to the art of Simon Sparrow. Zora Neale Hurston, "Characteristics of Negro Expression," in *Negro Anthology*, ed. Nancy Cunard (London: Wishart and Company, 1934), p. 40. Ken Hodorowski, Director of Carl Hammer Gallery, generously brought to my attention the talents of Simon Sparrow.

33. Elizabeth A. Fenn, "Grave Decorations in Coastal North Carolina," unpublished paper delivered in the graduate seminar, Space and Architecture of the Black Atlantic World, Yale University, April 1983. In addition to Ms. Fenn's excellent survey of decorated graveyards in North Carolina, there are literally scores of studies that examine this largely southern phenomenon. Of special note are: Puckett, *op. cit.*, pp. 104-108; Samuel Miller Lawton, *The Religious Life of South Carolina Coastal and Sea Island Negroes* (Ph.D. dissertation, George Peabody College for Teachers, 1939); John M. Vlach, *The Afro-American Tradition in Decorative Arts* (Cleveland: The Cleveland Museum of Art, 1978), pp. 139-147; and Robert Farris Thompson and Joseph Cornet, *op. cit.*, pp. 181-203.

34. Specific references to the Field Museum *Nkisi N'Kondi* appear in Ezio Bassani, "Kongo Nail Fetishes from the Chiloango River Area," *African Arts*, vol. 10, no. 3 (April 1977), pp. 36-40, 88, and Robert Farris Thompson, "The Grand Detroit N'Kondi," *Bulletin of the Detroit Institute of Arts*, vol. 56, no. 4 (1978), pp. 206-221.

35. Thompson, *Flash of the Spirit/op. cit.* A discussion of the "collage sensibility" and other aspects of Afro-American art are addressed in Richard J. Powell, "The Blues Aesthetic: Afro-American Culture as an Instrument of Style in Modern American Painting" (M.A. thesis, Yale University, May 1982).

TOURS FOR MEMBERS

KENYA

September 8-27, 1984
$3,595
(per person, double occupancy)

An exciting, adventurous and in-depth safari carefully planned under the expert guidance of our leader, Audrey Faden. She served on the Field Museum Volunteer staff and has done field research and general collecting of plants in Kenya. A native of Kenya, Audrey is a former staffer of the National Museum of Kenya, and her keen interest in wildlife, conservation, and plant life makes her a natural to lead our tour. If you have an inquisitive mind and would like to learn about the wildlife, ecology, and plant life, this safari should be your choice. Photography will be a major objective on this tour and our specially equipped safari vehicles will provide clear visibility for all tour participants.

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The tour price includes hotel and camp accommodations, three meals each day, except in Nairobi where full breakfast only is included, plus a special cocktail party and welcome and farewell dinners. No meals in London. Air transportation via British Airways, plus all transfers, baggage handling, safari vehicles, entrance fees, hotel taxes and all gratuities. An advance deposit of $50.00 per person will ensure your reservation on this East African Safari. Please make checks payable to Field Museum. For further information, please call or write Dorothy Roder: (312)322-8862.

Audrey Faden

Audrey Faden

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☞ China Tour, which will include Beijing (Peking) and Sian.

Last call for Field Museum's June tour to Alaska. If interested, please call Dorothy Roder now (322-8862).

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Black Folk Art in America: 1930-1980

April 14-July 15

April

14, Saturday, 2:00pm: **"What Is Folk Art?: Symposium"**
Panel: Lynda Roscoe Hartigan, Phyllis Kind, James Parker, Sterling Stuckey; moderator: Richard Powell

28, Saturday, 2:00pm: **Lecture: "Indelible Icons: The Black Atlantic Visual Tradition"**
by Robert Farris Thompson, professor of art history, Yale University

May

5, Saturday, 2:00pm: **Lecture: "The Origins and Development of Black American Folk Art"**
by Regenia Perry, professor of art history, Virginia Commonwealth University

6, Sunday, 2:00pm: **Performance: "Gospel Music: Spirit of the People"**
by 180 choir members of Trinity United Church of Christ of Chicago

13, Sunday, 2:00pm: **Performance: "A Teller of Tall Tales, Jack Tales and Ghost Tales"**
by Jackie Torrence, Granite Quarry, N.C.

19, Saturday, 2:00pm: **Lecture: "Memory and Sense of Place in Black Folk Art"**
by William Ferris, director, Center for the Study of Southern Culture, University of Mississippi

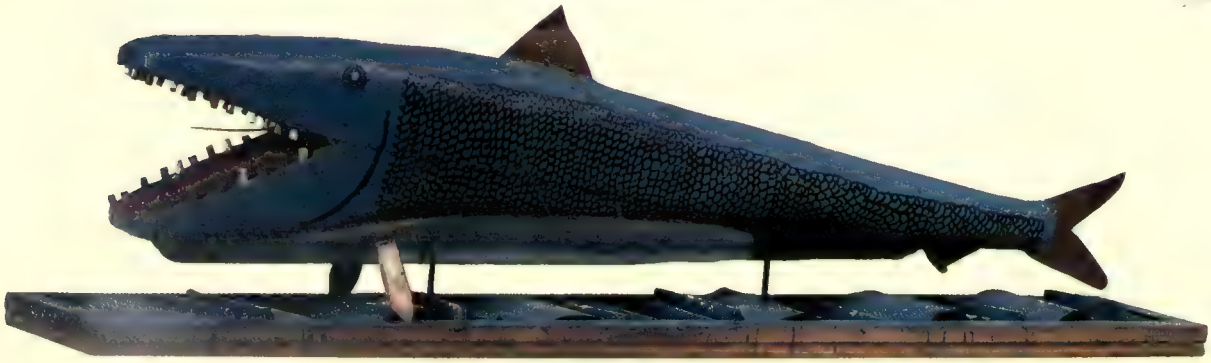
20, Sunday, 2:00pm: **Performance: "Blues Chicago Style"**
by Chicago musicians; moderators: Amy and Jim O'Neal, editors of *Living Blues*, journal of the black American blues tradition.

June

3, Sunday, 2:00pm: **Performance: " West African Rhythms"**
by Mandingo Griot Society of Chicago

17, Sunday, 2:00pm: **Performance: "Adventures in Rhythm and Song,"**
by Ella Jenkins, Chicago folk singer

23, Saturday, 2:00pm: **Performance: "Africa's Gift to the World,"**
by Darlene Blackburn Dance Troupe, Chicago



"Fish," painted wood and metal sculpture by Leslie Payne, 13 x 45¼ x 7½" (1970s), on view in exhibit "Black Folk Art in America 1930-1980," April 14 through July 15.

FIELD MUSEUM OF NATURAL HISTORY BULLETIN

June 1984

West African Rhythms by The Mandingo Griot Society: June 3
Adventures in Rhythm and Song by Ella Jenkins: June 17
Darlene Blackburn Dance Troupe: June 23

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CONTENTS

June 1984
Volume 55, Number 6

June Events at Field Museum 3

Fort Ancient: Citadel Or Coliseum?
by Patricia S. Essenpreis, research associate in Anthropology, and Michael E. Moseley, curator of Middle and South American archaeology and ethnology 5

In Pursuit of Amphibians and Reptiles in East Malaysia
A report from the field by Robert F. Inger, curator, Division of Amphibians and Reptiles 11

William G. Swartchild, Jr., in Memoriam 13

STICI: A Training Program for Teachers
by Carolyn Blackmon, chairman, Department of Education, Maija Sedzielarz, coordinator of the Joyce Foundation Teacher Training Program, and Helen H. Voris, special projects writer, Department of Education 14

Volunteers Honored 18

Tours for Members 27

COVER

Chinese snuff bottles: 32 representatives (front and back cover) from Field Museum's extensive collection. A large selection of these beautiful objects have recently been placed on permanent exhibit in Hall 24 ("Ancient China").

The art of fashioning snuff bottles in China came about as the result of a gift from Louis XIV of France in 1692 to the Emperor K'ang Hsi (1662-1722): a set of striking, gold-enameled boxes for holding snuff. The emperor was more intrigued by the gemlike boxes than their contents, and he invited Jesuit artists to Peking to demonstrate how to reproduce certain colors used on the boxes. However, it remained for K'ang Hsi's grandson, the Emperor Ch'ien Lung (1735-95), to bring about a vogue for snuff and snuff bottles.

A large number of the Museum's snuff bottle collection were the gift, in 1936, of Mrs. Frances Gaylord Smith, and all of those shown here were given by her, except one (top row, front cover, second from left—the gift of Mr. Sidney Teller).

Front cover, row by row, from top left: *C232447: porcelain, stopper of imitation coral. C233421a: lacquer-covered brass. C232420: porcelain, stopper of coral. C232424: blue glass painted with enamel, stopper of rose quartz. C232193: glass, quartz stopper. C232403: glass painted on inside, stopper of jade. C232154: glass, jade stopper. C232266: brown onyx, stopper of jade. C232339: chalcedony, stopper of glass. C232324: stone, stopper of quartz. C232291: agate, stopper of jade. C232371: agate, stopper of glass. C232034: porcelain, coral stopper. C232238: quartz, stopper of coral and turquoise. C232480: ivory (made in Japan, probably for the Chinese market). C232221: cinnabar lacquer, stopper of lacquer.*

Back cover: *C232206: glass, stopper of glass. C232175: glass, stopper of quartz. C232165: glass, jade stopper. C232178: glass, glass stopper. C232410: brown stone, jade stopper. C232092: glass, coral stopper. C232400: agate, stopper of coral and turquoise. C232478: porcelain, stopper of imitation coral. C232134: porcelain, glass stopper. C232110: glass, stopper of jade. C232469: porcelain, stopper of quartz. C232043: glass, stopper of coral and glass. C232259: rock crystal, jade stopper. C232429: porcelain, stopper of lapis lazuli. C232217: walrus tusk (stained), quartz stopper. C232054: glass, stopper of glass.*

Photos of snuff bottles by William C. Bentley, a volunteer.

Events

Black Folk Art Programs

These programs are designed to complement the special exhibit "Black Folk Art in America 1930-1980." The programs are funded by a grant from the National Endowment for the Humanities, a federal agency.

West African Rhythms
The Mandingo Griot Society and Foday Musa Suso
Sunday, June 3, 2:00pm
James Simpson Theatre, West Entrance

In Western Africa, griots form a special group of master musicians, oral historians, praise singers, poets, and keepers of tradition. Since its formation in 1977, the Mandingo Griot Society has captivated audiences throughout Europe and the United States with its unique blending of African and Western musical styles. In addition to bass, tap drums, and guitar, the society uses a wide range of ethnic instruments, including the *kora*, the 21-string harp played exclusively by the Mandingo griots. Join us for this performance, which blends Mandingo traditional songs and original compositions.

Tickets: $6.00 (Members: $4.00)
Please use coupon on p. 4 to order tickets.

Adventures in Rhythm and Song
Ella Jenkins, singer and songwriter
Sunday, June 17, 2:00pm
Stanley Field Hall

Ella Jenkins would like to teach the world to sing—and perfect harmony doesn't matter! Ella Jenkins is a magician with children of all ages and devotes her life to demonstrating her extraordinary musical talents to people all over the world. Along with her harmonica and ukulele she encourages everyone to snap fingers, clap hands, stomp feet, hum, and whistle, creating a spontaneous and impromptu sing-along concert. Join us for this high-spirited concert as Ella sings and gets folks a-singing!

This program is free with Museum admission, and tickets are not required.

Africa's Gift to the World
Darlene Blackburn Dance Troupe
Saturday, June 23, 2:00pm
Stanley Field Hall

Since 1967, the Darlene Blackburn Dance Troupe has performed to enthusiastic audiences the world over. In this two-part program the troupe performs numerous West African Dances, including Ju Ju Social Dance, the Fetish Priest Dance, and Adowa, a funeral dance done by the Ashanti people. The second part highlights Darlene Blackburn's original choreography and features Raw Soul, From Africa to America, Female Ritual, and the St. Thomas Calypso.

This performance is free with Museum admission, and tickets are not required.

The Mandingo Griot Society

Black Folk Art: Film Series

Films are screened on Saturdays in June, beginning at 1:00pm. On Saturday, June 23 children's films are featured. Film notes are available. These films are free with Museum admission and tickets are not required.

June 2: "Maxwell Street Blues" (56m)
June 9: "Du Côte de Memphis" (58m)
"Hush Hoggies Hush" (4m)
June 16: "Bottle Up and Go" (18m)
"The Blues According to Lightnin' Hopkins" (28m)
June 23: "A Boy Creates" (10m)
"Legend of John Henry" (11m)
"George Dumpson's Place" (8m)
"A Story, A Story" (10m)
June 30: "Sermons in Wood" (27m)
"Nellie's Playhouse" (14m)

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Events

CONTINUED FROM PAGE 3

June Weekend Programs

Each Saturday and Sunday you are invited to explore the world of natural history at Field Museum. Free tours, demonstrations, and films related to ongoing exhibits at the Museum are designed for families and adults. Listed below are only a few of the numerous activities available each weekend. Check the *Weekend Passport* upon arrival for the complete schedule and program locations. These weekend programs are free with Museum admission and tickets are not required. The programs are partially supported by a grant from the Illinois Arts Council.

June 9 — 2:30pm *Traditional China* (tour). Examine the timeless imagery and superb craftsmanship represented by Chinese masterworks in our permanent collection.

June 10 — 12:00 noon *Welcome to the Field* (tour). Enjoy a sampling of our most significant exhibits as you explore the scope of Field Museum.

2:30pm *Treasures From the Totem Forest* (tour). A walk through Museum exhibits introduces the Indians of southeast Alaska and British Columbia, whose totem poles and masks proclaim their pride of rank and mystical ties to animals and spirits.

June 16 — 2:30pm *China: The Golden Age* (slide lecture). Look at the achievements of several early dynasties of traditional Chinese civilization.

June 17 — 2:30pm *Life in Ancient Egypt* (tour). Focuses on the objects and practices, including mummification, which illustrate ancient life in the Nile Valley.

June 23 — 11:30am *Ancient Egypt* (tour). Tour the Museum's Egyptian exhibit and investigate the traditions of ancient Egyptian civilization from everyday life to mummification and the promise of an afterlife.

1:30pm *Tibet Today* (slide lecture). See Lhasa and other towns now open to tourists, as well as Tibetan refugees who have carried their religion into the mountainous areas surrounding this ancient religious center.

2:30pm *Bhutan: Land of the Thunder Dragon* (slide lecture). Experience a Himalayan journey as you explore Bhutan, "Land of the Thunder Dragon."

3:30pm *Tibet* (tour). A closer look at Field Museum's Tibetan exhibit.

June 24 — 12:00 noon *Welcome to the Field* (tour). Enjoy a sampling of our most significant exhibits as you explore the scope of Field Museum.

2:30pm *Chinese Ceramic Traditions* (tour). This 45-minute tour of masterworks in the permanent collection explores 6,000 years of Chinese ceramic art.

June 30 — 2:30pm *China and the Silk Roads* (slide lecture). Travel the ancient caravan routes and follow the course of empires, arts, and faiths.

Ella Jenkins, Sunday, June 17

Registration

Please complete coupon for your program selection and any other special events. Complete all requested information on the application and include section number where appropriate. If your request is received less than one week before program, tickets will be held in your name at West Entrance box office until one-half hour before event. Please make checks payable to Field Museum. Tickets will be mailed on receipt of check. Refunds will be made only if program is sold out

Program Title	Member Tickets #Requested	Nonmember Tickets #Requested	Total Tickets #Requested	Amount Enclosed
			Total	

Name

Street

City State Zip

Telephone Daytime Evening

Have you enclosed your self-addressed stamped envelope?

For Office Use:

Date Received **Date Returned**

Return complete ticket application with a self-addressed stamped envelope to:

Public Programs· Department of Education
Field Museum of Natural History
Roosevelt Road at Lake Shore Drive
Chicago, IL 60605-2497

FORT ANCIENT: CITADEL OR COLISEUM?

Past and Present Field Museum Explorations Of a Major American Monument

by PATRICIA S. ESSENPREIS and MICHAEL E. MOSELEY

Fig. 1. *Warren K. Moorehead (center, white suspenders) with his crew of excavators in Ohio during explorations for the World's Columbian Exposition in 1891. Although a self-taught archaeologist, Moorehead discovered more about Fort Ancient than any other investigator, past or present. Photo courtesy Ohio Historical Society.*

THE MONUMENT

Fort Ancient is a vast, remarkable earthwork erected more than 2,000 years ago by Hopewell inhabitants of southwestern Ohio. It encloses the spacious summit of a mesa towering 80 m above the Little Miami River, where it flows through a deep, narrow canyon. Monumental construction entailed the building of linear earthen embankments up to 7 m high and 21 m wide, over a distance of 5.7 km. These walls run strategically along the crest of a figure 8-shaped mesa to form large northern and southern enclosures connected by a narrow, elongated middle or central enclosure (figs. 2 and 3).

At the time the great embankments were constructed and for almost a millennium thereafter, Fort Ancient was one of the largest monuments in North America. The natural topography is interrupted on such a vast and forceful

Patricia S. Essenpreis is a research associate, Department of Anthropology; Michael E. Moseley is curator, Middle and South American archaeology and ethnology.

MAP OF

FT. ANCIENT

Scale 1/24 feet per inch

GRAHAM LITTLE

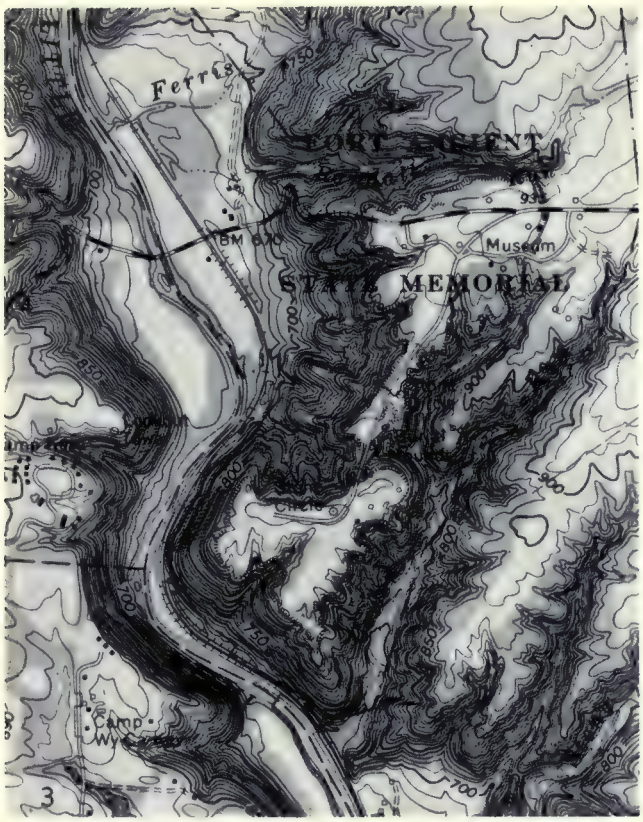


Fig. 2. (left). *Map of Fort Ancient drawn in 1891 for the World's Columbian Exposition under Moorehead's supervision (572 feet per inch). A parallel-walled enclosure (not shown) once extended ½ mile to the northeast from the two mounds by the road in the upper right.* ***Fig. 3 (above).*** *Recent topographic map of Fort Ancient State Memorial (3,280 feet per inch). The site and museum are open to the public Wednesdays through Sundays, Memorial Day through Labor Day.*

scale that the earthwork has long commanded admiration. Interest began when the youthful United States Congress opened Ohio to settlement by awarding land grants to Revolutionary War veterans and political supporters.

When the main stage road between Cincinnati and Chillicothe, Ohio, was built at the beginning of the nineteenth century, it ran through the north enclosure of Fort Ancient and descended to the river along an ancient graded way. By straddling a major thoroughfare the colossal earthwork attracted wide public attention. In 1809 the Philadelphia *Port Folio* printed a story and sketch map of the monument. Thereafter, many of the nation's most distinguished scholars and institutions became involved in the nineteenth-century explorations of Fort Ancient. These early explorations account for much of what is presently known about this imposing architectural complex and led to the ruins being protected as Ohio's first state park in 1891. Appropriately, the World's Columbian Exposition of 1893, which led to the founding of Field Museum, played a significant role in the exploration of Ohio earthworks, including the mapping of Fort Ancient.

Mapping a monument the size of Fort Ancient is not an easy task. The earthworks follow a tortuous path and encircle an area of 51 hectares (about 30 city blocks, or 1/5 square mile). There are at least 72 passages through the embankments, including 3 so-called "great gateway" complexes with causeways and attendant mounds. Within the three enclosures there are moatlike ditches adjacent to the embankments, flagstone pavings that probably served as roadways, a few small flagstone circles and several collapsed rock structures of unknown use, as well as 11 small free-standing mounds of oval and crescent form. However, the vast interior areas are basically vacant and lack evidence of Hopewell houses or remains of a resident population. Exterior to the embankments, artificial terraces were cut into the mesa sides, and below the south enclosure there are several "great terraces," each 4 m wide and upwards of 500 m long. Seven small mounds dot the plateau to the east, while a small circular earthwork sits atop the bluff across the river.

Fig. 4. *After bending and pounding more than 50 copper breastplates, earspools, and other ornaments out of shape, the Hopewell covered them with sheets of mica and buried them as a ceremonial offering in a small hole. This object was an embossed breastplate. Ohio Historical Society Cat. 23989.*

Fig. 5. *Aerial view of the south, or "old," fort, looking northeast. The embankment can be seen as a faint light line following the bluff edges. The arrow points to the great gateway, the main entry connecting the middle to the south enclosure.*

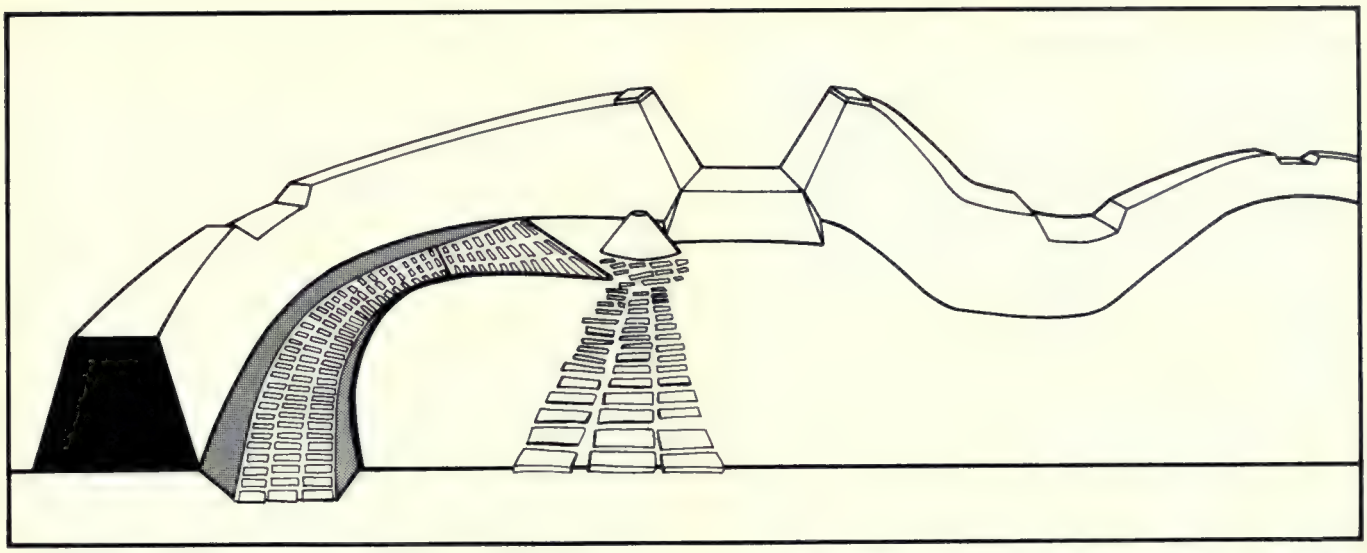
The Mound Builder-Red Man War

During the nineteenth century and at the time the Columbian Exposition was organized, scholars generally recognized three great New World civilizations: the Inca, the Aztec, and the more ancient and mysterious "Mound Builders," whose many great earthworks confronted the nineteenth century public. Mound Builder monuments fascinated the nation's greatest minds. Thomas Jefferson ranks as the first naturalist to systematically excavate and record an ancient earthwork when he supervised the opening of a mound on his Virginia estate prior to 1781. Europe was equally intrigued by the engineering and architectural achievements of the "lost civilization"; and two of the earliest ground plans of Fort Ancient were published in Germany and in France during the first decades of the 1800s.

Fort Ancient and other monuments attributed to the Mound Builders were correctly viewed as the works of a truly great civilization. Yet, this civilization was incorrectly thought to have been sacked and exterminated by the "barbaric Red Man," and thus was not ancestral to the American Indian. This interpretation was a product of the political climate of the times.

Following the Revolutionary War the greatest "foreign" foes of the United States were not European powers, but native societies battling colonization and expropriation of their territory by the new nation. The states rationalized westward expansion by espousing the notion that the natives were rude savages unworthy of occupying the territory they held. The prevalent sentiment was succinctly expressed in the simple motto, "The only Good Indian is a Dead Indian."

In driving the Red Man from the land, yet finding the land occupied by imposing works of a great civilization, the idea of the earthworks as evidence of Indian accomplishment was intellectually untenable. However, they could easily be accepted as the ruins of a vanished civilization that had been destroyed by the Indians. This explanation did two things. First, it separated ancient civilization from Indian ancestry. Second, it "proved" that Indians were sav-



ZBIGNIEW JASTRZEBSKI

age interlopers who did not deserve the lands they occupied because they had acquired them by annihilating a great civilization.

Permeating nineteenth-century thinking, this interpretation—known today as the "Mound Builder myth"—carried with it notions of a protracted war between Mound Builders and Red Men. This fabled war shaped early explorations and explanations of Fort Ancient. In essence, by portraying the earthwork as a great citadel of vanquished civilization, the fictitious war with the nihilist Red Man was demonstrated, and the Mound Builder myth thus substantiated.

The tenor of nineteenth-century interpretation was set by Caleb Atwater in the *Transactions of the American Antiquarian Society* of 1820. As a forefather of American archaeology, Atwater visited, described, and classified a variety of significant Mound Builder monuments. These included a number of flat hilltops enclosed by linear embankments about which he concluded: "On the whole, I have ventured to class them among 'Ancient Fortifications,' to which they appear to have higher claim than most any other, for reasons too apparent to require recital." Dismissing the many entrances and gateways as gaps left by incomplete construction, Atwater's assertion that Fort Ancient represented a defensive structure was based entirely upon its strategic castlelike setting and upon his conviction that "I have always doubted whether any people of sane minds would ever have performed quite so much labour in mere sport."

The setting of the monument is indeed dramatic and impressive. The earthwork has a commanding view of the Little Miami River, where it has cut a deep, narrow canyon through a wide plain flattened by Pleistocene glaciers. The

Fig. 6 (drawing). Fig. 7 (photo). *The great gateway even today funnels traffic into the south enclosure. A prehistoric stone pavement now buried beneath the sod connects the small mound left of the road to a deep ditch next to the wall and continues to the point from which the photographer took this photo.*

mesa enclosed by artificial walls is a remnant of this wide plateau, isolated by two streams, Randall and Cowen Runs. These streams arise less than 200 m apart at two springs some 100 m east of the north enclosure. Fort Ancient's builders treated the springs as very important, erecting a high, circular mound near each to create so-called "twin mounds." Although Randall and Cowen Runs have cut deep valleys along most of their courses, they are not deeply incised near the springs, leaving a wide natural land bridge between the mesa and the plateau to the east.

At the time of Atwater's observations, a very distinctive geometric structure still survived on the plateau. Beginning at the base of the twin mounds, two long, low earthen embankments extended inland in parallel for more than one-half mile to enclose a single small mound. The embankments were approximately 1 m high, 4 m wide, and 20 m apart with a flagstone pavement between them.

Fig. 8. *Moorehead excavated a number of stone graves in the valley below Fort Ancient. He assumed that these villagers built Fort Ancient and fled there for refuge during enemy attacks. We now know, however, that these burials belong to a later culture. Photo courtesy Ohio Historical Society.*

Although structurally unlike the rest of Fort Ancient, similar parallel-walled structures were built at other monuments. Atwater advanced the interpretation that these were roadways for playing ceremonial games: "If the roads were for footraces, the mounds were the goals from whence the pedestrians started, or around which they ran."

This ceremonial explanation did not suggest to Atwater that other structures at the monument might be of similar character, or at least nondefensive in nature. The great terraces below the south enclosure are massive features noted on the earliest site maps. Yet, seeing Fort Ancient as akin to a Rhineland castle, Atwater felt the terraces were of a military nature, having been "designed for persons to stand on, who wished to annoy those who were passing up and down the river."

Subsequent to Atwater's observations, Professor John Locke of Cincinnati and a party of a dozen engineers spent two days surveying and measuring the monument. Published in 1843 and reissued in 1848 in Volume I of the *Smithsonian Contributions to Knowledge*, the resulting map and short accompanying article remained the most authoritative statement about the earthwork for decades.

Locke also interpreted Fort Ancient as a defensive work, even though his survey demonstrated many facts that today make the site untenable as a fort. There are no interior quarters that might have garrisoned troops. Yet, the multitudes of troops needed to defend the 5+ km perimeter of earthworks would number in the tens of thousands. Moats are located inside embankments rather than defensively outside. The steep sides of the mesa are cut by deep narrow gulleys that alternate with gently sloping ridges and spurs (fig. 17). The embankments were placed so as to block and close off the heads of the gulleys, yet provide passages opening onto the ridges. In turn, the ridges were often graded and partly paved, and probably served as routes of access from valley bottom to the principal enclosures. With more than 70 passages opening on access routes, the architecture is hardly defensive in design.

Locke correctly identified this multitude of passages; yet, by asserting that each passage held a wooden blockhouse or bastion, he supported the prevailing notion that only a great fort could command such a strategic setting. However, while the embankments may have supported wooden structures atop their wide summits, excavations in

Continued on p. 20

Fig. 9. *Exotic artifacts, such as this mica cutout of a human hand from the Hopewell group, are common at geometric enclosures, but rare at hilltop enclosures like Fort Ancient. Cat. 110132. N90925.*

REPORT FROM THE FIELD:

In Pursuit of Amphibians And Reptiles in East Malaysia

A letter from Curator Robert F. Inger, Division of Amphibians and Reptiles, to Field Museum President Willard L. "Sandy" Boyd

Traveling by motorized canoe on the Mengiong River; Paul Walker at left.

Nanga Tekalit
Sarawak
March 18, 1984

Dear Sandy:
It has been raining continually but lightly since late yesterday evening, forcing us to postpone work in the forest this morning and giving me a chance to write some letters. We haven't had much time for that activity.

Nanga Tekalit isn't on many maps—and for a good reason. There's nothing here, so far as cartographers are concerned, except the junction of a large creek with a river, and that is what gives this spot its name: *Nanga* is an Iban word meaning "stream mouth," and Tekalit is the name of this treacherous creek, though it is lovely. We are about as far from the coast of Sarawak (the west coast of Borneo) as one can be without falling out of the country into Kalimantan, the Indonesian part of Borneo. This is not the first time I've worked at Nanga Tekalit. I set up a camp here in 1962 and left a small party here for a year. I returned again in 1970 for a short while. And now once more. I'm beginning to think of making a homesteading claim.

The reasons for coming here in the first place were the existence of a large area of primary rain forest (the main reason) and the existence of the last longhouse about 30 miles downriver, a source of good, essential labor. No one lives upriver on the Mengiong (which the Tekalit meets here). After that first year, I had enough data to answer a few questions, such as how many species of amphibians and reptiles live in one place (approximately 150). More importantly, additional questions cropped up and I became aware of the potential of this place as a site for investigating the structure and organization of a rain forest community of amphibians and reptiles.

One of the issues we hope to get reasonably conclusive data for is fluctuation in population size of lizard species in these forests. We already have good samples from three rain forest sites in Sarawak, including this one. Simply comparing these three samples tells us that population size varies from place to place. By obtaining a good sample from here, we hope to obtain an estimate of variation over time (a 20-year interval) at one place.

Curator Inger at camp site.

Above: *Associate Curator Harold Voris processes specimens in camp. The artfully tattooed back belongs to an Iban tribesman, one of six local helpers.* Right: *Frog specimen collected on forest floor (about lifesize).*

We also hope to learn something about changes over time in the frog populations living along creeks here. I published a paper on these populations in 1969. Collecting frogs, which we do by wading up streams at night using headlamps and our hands, is tiring but rewarding. We see and collect so much, and the creeks are beautiful, crystal-clear water (except after rain), with rocky bottoms over-arched by the forest. On moonlit nights, the scene is spectacular. But after a heavy rain, these streams are not so nice; in fact, it could be worth your life to step into one. When we work on them, however, we are able to concentrate on frogs—several of the smaller species form large aggregations of calling males and ripe females, and most of the larger species spread out along the banks. One of the observations that intrigues me is finding that the same species use the very same pools for breeding sites as in 1962. Although that is in a sense not surprising, it establishes a sort of stability and predictability that I find satisfying. But why these particular pools and not others on the same creeks? And how far do these particular species move away from these pools in the interval between breeding bouts? We did learn, by marking frogs and toads in 1962-63, that individuals return to the same pool where they were first marked.

Another general topic we are working on is the density of amphibians and reptiles on the forest floor. Most people have the notion that rain forests are filled with these creatures, that one must watch out for fear of stepping on a snake or frog. Not here! We've seen only four snakes in ten days and it isn't because we haven't been looking.

The procedure we are using for estimating density is to lay out a square 25 feet on a side marked by twine and, then, working inward from all sides, to remove carefully all the dead leaves and debris, capturing all the frogs, lizards and snakes we uncover. We've been very lucky so far and have found one animal per quadrat (as these square plots are known in ecology). By scattering the location of quadrats in random fashion and doing a large number of them, we will be able to estimate density. I've done this kind of work before at this site, in northeastern Thailand, and in south India. Repeating the process here provides a check on our earlier results. Then

Walker (left) *and Voris process the night's catch.*

William G. Swartchild, Jr.

1909-1984

The death of William G. Swartchild, Jr., former chairman of Field Museum's Board of Trustees, on March 15, was a loss beyond measure to Field Museum and its trustees, Women's Board, and staff.

Mr. Swartchild was born in Chicago in 1909. After graduating from Dartmouth, where he was elected to Phi Beta Kappa, he entered Swartchild & Company, a family business of which he was president at the time of its sale in 1973. Although he devoted a great deal of his time to public service throughout his life, his retirement from active business responsibilities freed him to devote full time in service to others—service which continued until his death.

He was elected a trustee of Field Museum in 1966. Typical of his sense of commitment to any institution with which he became associated, he quickly took an active leadership position among the trustees. In 1972-73 he was a member of a trustees' committee that developed a reorganized Board structure. Upon that reorganization he became vice chairman of the Board, heading the important Program Planning and Evaluation Committee. He was elected chairman of the Board of Trustees in 1978, serving in that capacity until 1982. Following his chairmanship, Mr. Swartchild served as vice chairman, Internal Affairs, and as a member of the Nominating Committee.

William Swartchild had an extraordinary understanding of the dynamics of nonprofit institutions and the various constituencies comprising the institution. At Field Museum this was evidenced by the complete confidence in him on the part of the staff, Women's Board, and trustees.

He was active and equally respected in the American Association of Museums, serving as a vice chairman of the Trustees' Committee and as a member of the Commission on Museums for a New Century—a national planning effort for the years ahead. He was instrumental in preparing American Association of Museums' *Museum Trusteeship* and *Museum Ethics*.

Active for many years in the field of health care, Mr. Swartchild served as Trustee of Michael Reese Hospital, Children's Memorial Hospital, and McGaw Medical Centers and he was chairman of Children's and McGaw, as well as the Council on Governance of the Illinois Hospital Association, at the time of his death. He had served as a director of Blue Cross and Blue Shield of Illinois and of HMO Illinois. Mr. Swartchild was also a trustee of the Brookfield Zoo.

William G. Swartchild, Jr.

Beyond all of his achievements in business and philanthropy, he was a warm and thoughtful person who cared about people. He brought a quality of excellence and humanity to anything he touched. He was a model of dedication of personal energy for the public good. The City of Chicago is a better place because of William Swartchild's life.

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we will feel better about comparing results from forests all over tropical Asia.

Maybe I should explain use of the plural pronoun. As you know, Harold Voris [associate curator of amphibians and reptiles], is here, having joined me in Singapore after his work on sea snakes in west Malasia. The other "Westerner" is Paul Walker, a graduate student at Leeds University, in England. The Sarawak Museum in Kuching (by the way, that institution is slightly older than the Field Museum) has an interest in this project and has attached one of its collectors, Bidai, to our party. Bidai worked with me in 1956. (Heavens! I've known him most of his life.) Our labor force consists of 6 Ibans from "our" longhouse. Good people, strong, hard working, knowledgeable in the forest, and pleasant to be with.

Our living accommodations, if I may dignify them that way, consist of an open-walled shack made of poles lashed together with vines and topped by red-white-and-blue striped plastic and a detached cook stand. We've used nails almost exclusively for hooks to hang clothing and miscellany, which seems to be a very large category.

The camp clearing is, perhaps, 100 x 50 feet and on a steep 25 x 50 foot bank. The forest surrounds us except for the river front. That steep bank is essential to a good camp site here—though the Mengiong is about 200 feet wide at this point, it can rise 20 feet in 4-6 hours. Our food, like our dwelling, is simple and a bit monotonous, but we didn't come for gourmet food. We hope things are well at the Museum. Harold will see you early in April and I in early June. My best to everyone. —*Bob*

STICI:
A Training Program for Teachers

by Carolyn Blackmon, Maija Sedzielarz, and Helen H. Voris

A Museum biology instructor introduces program participants to new aspects of public exhibits.

Ron Hales Testa

What's wobbly as an egg? . . . silvery as fish scales? . . . heavy as a pancake at midnight? If you answered, "a wok," you may have been talking to one of the participants in Field Museum's "Student/Teacher Internship in a Cultural Institution."

"STICI," as it's known for short, is the Education Department's program of workshops and field trips designed to train Chicago teachers in the special object-based skills needed to teach effectively in museums. The two-year program, funded by The Joyce Foundation, offers groups of teachers the opportunity to participate in a two-week workshop at Field Museum followed by a field trip to the Museum with their classes.

The goal of the STICI program is to develop

A STICI teacher brings her class to the Museum for the field trip portion of the program. Diane Alexander White

teachers' confidence and competence in using museums as extensions of their classrooms. To bring excitement and life to subjects that students can otherwise only read about, the program stresses the importance of "getting students inside the exhibits" and of fully integrating museum experiences with classroom studies. To accomplish these goals, the program trains teachers to develop focused field-trip experiences that require students to interact with the exhibits by observing, questioning, hypothesizing, comparing and contrasting, drawing conclusions, and creating verbal, written, or artistic expressions of their experiences.

The workshops begin with behind-the-scenes tours of the Museum to enable the participants to learn about its extensive research collections and the work of its scientist-scholars. The participants have the opportunity to see how scientific specimens — from clay pots to nuthatches—are documented, prepared, and stored, forming a "library" of reference material used by scholars throughout the world.

In the Exhibition Department they see how exhibits are developed, prepared, and mounted. They also learn how to analyze exhibits to determine how they communicate, and how to develop field-trip themes and exhibit-based experiences to teach almost any subject. Math concepts of size and proportion, for example, take on reality for elementary school children who try to see how many can fit inside the outline of the whale skeleton on the floor of the skeletal structure hall, or how much of the *Apatosaurus,* in the fossil vertebrate hall, is tail!

The participants receive special introductions to the Education Department, where they meet key

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Carolyn Blackmon is chairman of the Education Department, Maija Sedzielarz is coordinator of The Joyce Foundation Teacher Training Program, and Helen Voris is writer for special projects in the Education Department.

Diane Alexander White

STICI teachers learn how to use museums to help their students develop life-long learning skills.

staff members and learn of the many programs and materials provided for teachers and their classes. They visit special teaching facilities in the Museum—the Place for Wonder and the Pawnee Earth Lodge—and they explore offerings in the Museum's free loan program, including portable exhibit cases, experience boxes ("hands-on" specimens and artifacts), and audiovisual and printed materials — slide sets, filmstrips, videotapes, discovery units, posters, and curriculum coordination guides.

"Getting to Know You," a self-guided tour developed especially for the STICI teachers, enhances their familiarity with the public areas of the Museum as they explore its furthest corners to find clues in answer to such questions as "What is the design on the Indian Mic-Mac dice?" or "What skeletal structure is unique to all marsupials?" In this process they learn how to ask effective questions to get students to look closely at the objects in the exhibits, and they learn about practical matters important to any teacher with a large group of small children—such as how to get to the nearest restroom from any point in the Museum! Participants also take trips to other museums to learn about additional resources available to teachers and students in Chicago's other cultural institutions.

Getting back to the observation that a wok is as wobbly as an egg — how does that fit in? Teachers participate in a variety of exercises designed to help them (and eventually their students) develop abilities to observe and question; these abilities, in turn, will enable them to learn from objects — anthropological artifacts, biological and geological specimens, and works of art. In one exercise, teachers are asked to devise food similes for describing a wok, which is one of ten objects set up around a classroom. Observa-

tional as well as language skills are involved in the responses, but there is more to it than that. For students, the observations and interest generated by the exercise could serve as the basis for further questions and investigation about the wok: its materials, construction and function, and the significance of its fuel-conserving design in Chinese culture.

During the sessions, teachers develop and try out activities to use with their classes before and after a field trip to the Museum. Subsequently they plan and carry out their class field trips, using free bus transportation provided by the STICI program. The teachers have been delighted and often surprised at the results of their STICI training: the absence of problems on their class field trips, their own confidence and ease in the Museum, and, most of all, the children's responses.

Many teachers have found that shy children open up with the excitement of learning in the museum and that this continues later in the classroom; that children who can be discipline problems in the classroom often adopt different attitudes in the museum; and that children who have trouble reading and writing develop new confidence in themselves by using observational and verbal skills at the museum.

STICI teachers acknowledge that they put more time and planning into their field trips than before, but they overwhelmingly feel it is worth it. "I never knew a field trip could be relaxed," "Even the parent chaperones enjoyed the trip," and "Many children who had been to the Museum before had such a different experience this time that they wanted to bring their parents back" are typical comments made in follow-up sessions.

Teachers often remark that children remember details of their field trip experiences and bring them up in class discussions long after the trip is over. One first grader, after studying plants and animals from Hawaii and Alaska on an early fall field trip to Field Museum, asked his teacher as Christmas approached, "Do you think Rudolf the Red-Nosed Reindeer might really be a caribou?" One teacher summed it up best: "Children never forget what they really enjoy, and at the Museum they can both learn and enjoy."

Field Museum will be offering four more sessions of the STICI program this summer to Chicago teachers. Interested teachers should contact the Education Department, 922-9410, extension 365. FM

Gail Stern

Program participants learn a variety of ways to use objects in their teaching, such as the wok, shown here.

Stephen didn't think he needed a will. He was only 51 . . .

Stephen intended to have his will drawn up someday; first, there were things to get done. He had no idea he would need a will anytime soon—before he got those "things" done. A will is like life insurance: when you need it, it's too late to do anything about it.
Now, Stephen's family is facing unnecessary delays, confusion, and extra expenses in settling his estate.

Don't make the same mistake. Send for our complimentary booklet giving all the reasons why a will is important and how you can plan an effective will.

---------- CLIP AND MAIL TODAY ----------

To: Planned Giving Office
Field Museum of Natural History
E. Roosevelt Rd. at Lake Shore Dr.
Chicago, Illinois 60605

( ) Please send me my free copy of "How to Protect Your Rights with a Will."

NAME _____

ADDRESS _____

CITY _____ STATE ____ ZIP ____

I can be reached at:

Phone Bus. ( ) _____ Res. ( ) _____

Volunteers Honored

Field Museum's 321 volunteers were honored for their 1983 service at a reception on February 14, held in Stanley Field Hall. Collectively, the volunteers had given 41,454 hours of dedicated service to the Museum during the calendar year, including 2,252 hours in connection with the special exhibit, "Treasures from the Shanghai Museum," which opened November 5.

Field Museum Director Lorin I. Nevling, Jr. gave an introductory welcome to the volunteers, and James J. O'Connor, chairman of the Board of Trustees, spoke of the great diversity of specialized talents brought to the institution by volunteers. Dr. Nevling then presented a special award to Lorain Stephens Olsen, who had given fifteen years of continuous service. Carolyn Blackmon, chairman of the Education Department, and Melvin A. Traylor, Jr., curator emeritus of Birds, whose departments were primary beneficiaries of Mrs. Olsen's service, spoke of her dedication and particular projects.

Mrs. Olsen first came to Field Museum as a staff member, serving as a biology instructor on the Education Department, where she developed and presented programs to school classes. Although she relinquished this position to raise a family, Field Museum had become an important part of her life, and she returned in 1968 as an Education volunteer. Hired in 1974 again as a staff member to organize the Kroc Field Trip program, Mrs. Olsen continued her volunteer activities.

In 1975 she began assisting Mr. Traylor, who, in partnership with the Bird Department of the Museum of Comparative Zoology at Harvard, was preparing bird locality gazetteers of South American countries. She assisted in completing the gazetteer for Columbia, then became involved in that for Peru as her special concern. After many years of research and writing, she completed the manuscript as coauthor with Mr. Traylor. Currently she is assisting in preparing the Guyanas gazetteer. In 1977 Mrs. Olsen was made an associate of Field Museum's Bird Division, to which she has given a minimum of 250 hours annually since 1976.

Following the special presentation to Mrs. Olsen, Dr. Nelving presented gifts to volunteers who had contributed more than 500 hours during 1983. Concluding remarks were made by Joyce Matuszewich, volunteer coordinator, who expressed gratitude to volunteers as well as to staff supervisors for their joint achievements during the year.

Volunteers Who Served 500 Hours or More

Sophie Ann Brunner, Zoology, Reptiles Division: skeleton preparation, organization, and maintenance.

Pat Dodson, Anthropology: manuscript editing and proofing, correspondence and research.

Margaret Martling, Botany: worked with reprint collection, helped select negatives for type photograph program, developed indices for museum publication, maintained nomenclature reference files.

Gary Ossewaarde, Education: researched and conducted weekend tours on Egypt and China, "Treasures From the Shanghai Museum" volunteer, assisted in special events and workshops.

Llois Stein, Anthropology: researched and cataloged Oceanic, Malaysian, and African collections; assisted in Pacific storeroom reorganization; assisted with cataloging the gamelan collection.

Susan Saric, Anthropology: assisted in cataloging Oliphant collection of artifacts from Cameroun; Geology: worked on mammalian biogeography project; Planning and Development: researched foundations and corporate prospects.

Over 400 hours

Sol Century, Anthropology: cataloging, general projects in Asian Division.

Nancy Evans, Education: helped plan and implement Summer Fun Children's workshops, developed weekend Family Feature.

Peter Gayford, Anthropology: research and cataloging of the Egyptian and sub-Saharan material in the McCormick collection.

Dorothy Oliver, Library: indexed Museum's annual reports, assisted with interlibrary loan requests, filed new book cards, retrieved books for visitors; special projects.

Forman Onderdonk, Education: conducted programs for school groups and public for the "Treasures From the Shanghai Museum" exhibit and in the Indian halls and Pawnee earth lodge, assisted with children's workshops and special events.

Jean Seiler, Geology: research in variation of dental characteristics of neotropical primates, photography, measurements of teeth and jaws, statistical analysis of data.

Over 300 hours

Jackie Arnold, Education: clerical assistance for several departments, "Treasures From the Shanghai Museum" volunteer; assisted in special events and children's workshops.

Margaret Axelrod, Education: conducted programs for school groups and public for the "Treasures From the Shanghai Museum" exhibit and in the Place for Wonder, designed puppets for shadow puppet theatre program.

Dennis Bara, Membership: weekend membership representative.

Audrey Burns, Exhibition: assisted as exhibit preparator, fabricating and installing exhibits.

Louva Calhoun, Anthropology: assisted in cataloging of specimens from Isimilia prehistoric site in Tanzania, a project involving 7,500 specimens which she began in 1977 and finished in December 1983.

Connie Crane, Anthropology: assisted in correspondence regarding Maritime Peoples of the Northwest Coast exhibit, research assistant.

Jeannette DeLaney, Anthropology: textile conservation, worked with pre-Columbian Peruvian textiles; Education: "Treasures From the Shanghai Museum" volunteer.

Jeyson Daniel, Botany: worked on taxonomic revision of the *Agaricales* mushroom in Cryptogamic Herbarium.

Halina Goldsmith, Education: conducted programs for school groups and public for the "Treasures From the Shanghai Museum" exhibit, Maritime Peoples Hall and in Place for Wonder; assisted with special events.

Evelyn Gottlieb, Education: gave programs to school groups and public in Egyptian halls, gave Highlight tours, assisted with special events and children's workshops.

Carol Landow, Education: conducted programs for school groups and public in Place for Wonder; assisted with special events, "Treasures From the Shanghai Museum" volunteer.

Carolyn Moore, Anthropology: researched special projects in Asian Division.

Jennifer Newman, Public Relations: newsclip compilation and research, media liaison, updated mailing and contact lists, filled media requests, typed, helped with mailings.

Eddie Nodzenski, Zoology, Division of Amphibians and Reptiles: collection management, cataloging of specimens and scanning electron microscope work.

Dagmar Persson, Botany: research on Costa Rican species of the mint family.

Florence Selko, Education: gave programs for school groups and public in Egyptian halls and Maritime Peoples Hall, "Treasures From the Shanghai Museum" volunteer, assisted in children's workshop and special events.

James Skorcz, Library: worked in reading room, filled interlibrary loan requests, filed cards in card catalog, retrieved books for visitors, compiled statistics, special projects.

Osa Theus, Public Relations: promotion research, media liaison, writing, typing, and mailings.

Mary Wenzel, Education: conducted programs for school groups and public in the Place for Wonder, "Treasures From the Shanghai Museum" volunteer, assisted with special events; Zoology, Insects Division: handled correspondence, typed field notes and loan invoices, other office duties.

50 hours or more

Neal Abarbanell
Paul Adler
Gretchen Ainley
Cathy H. Agnone
Dolores Arbanas
Arden Frederick
Jacqueline Arnold
Terry Asher
Margaret Axelrod
Gail Bahl
Beverly Baker
Dennis M. Bara
Lucia Barba
Gwen Barnett
Winifred Batson
Dodie Baumgarten
Virginia Beatty
William C. Bentley
Lawrence Berman
Elaine K. Bernstein
Blanche Blumenthal
Sandra Boots
William Borth
Hermann C. Bowersox
Charles Braner
Carol Briscoe
Linda Brown
Sophie Ann Brunner
Janet Bry
Teddy Buddington
Mary Ann Bulanda
Laurel Bunce
James Burd
Audrey Burns
Eleanor Byman
Joseph Cablk
Kathy Cagney
Louva Calhoun
Donna Compeol
Deborah Carey
Sol Century
Margaret Chung
Barbara Clauson
Charlotte Cram
Connie Crane
Jeyson Daniel
Margaret Davis
Margaret DeJong
Eleanor DeKoven
Jeannette DeLaney
Carol Deutsch
Violet Diacou
Marianne Diekman
Phyllis Dix
Patricia Dodson
John E. Dunn
Stanley Dvorak
Lynn Dyer
Carolyn Eastwood
Linda Egebrecht
Ruth Egebrecht
Anne Ekman
Agatha Elmes
Bonnie Engel
Sara Erve
Jean Ettner
Nancy Evans
Nancy Fagin
Martha Farwell
Dolores Fetes
Louise Fields
Marie Fischl
Michael Fisher
Ruth Fouche
Brad Foxen
Gerda Frank
Richard Frank
Arden Frederick
Ruth Fritz
Janina Fuerst
Shirley Fuller
Miriam Futransky
Bernice Gardner
Suzanne Garvin
Andrea Gaski
Peter Gayford
Donald Gemmel
Marty Germann
Audrey Gilman
Elizabeth Louise Girardi
Delores Glasbrenner
Carla Goldsmith
Halina Goldsmith
Paul Goldstein
Melanie Goldstine
Evelyn Gottlieb
Julie Gray
Loretta Green
Henry Greenwald
Cecily Gregory
Mary Lou Grein
Ann B. Grimes
Karen Grupp
Michael J. Hall
Patricia Hansen
Nancy Harlan
Curtis M. Harrell
Calvin Harris
Mattie Harris
Nancy Hartnett
Ollie Hartsfield
Noreen Haslinger
Shirley Hattis
Margaret Helbing
Audrey Hiller
Clarissa Hinton
James Hitz
Peggy Hoberg
Harold L. Honor
Zelda Honor
Scott Houtteman
Claxton Howard
Ruth Howard
Ellen Hyndman
Delores A. Irvin
Doug Jacobs
Paul Jensen
Micki Johns
Mabel S. Johnson
Nancy Jonathan
John Jones
Malcolm Jones
Carol Kacin
Elizabeth Kaplan
Dorothy Karall
Mansura Karim
Dorothy Kathan
Shirley Kennedy
Barbara Keune
Joyce Kieffer
Dennis Kinzig
Alida Klaud
Susan Knoll
Glenda Kowalski
Anita Landess
Carol Landow
Barbara Latondress
Marion Lehuta
Anne Leonard
Frank Leslie
Joseph F. Levin
Laura Lewis
James Lowers
Ruth Luthringer
Susan Lynch
Gabby Margo
Barbara Marion
James A. Marshall
Margaret Martling
David Matusik
Marita Maxey
Melba Mayo
Faye McCray
Carole McMahon
Withrow Meeker
Ixtaccihuatl Menchaca
Beverly Meyer
Jerry Meyer
Robyn Michaels
Micki Johns
Rosanne Miezio
Lenore Miller
Alice S. Mills
Star Mitcheff
Carolyn Moore
Holly Morgan
Eileen Morrow
George Morse
Charlotte Morton
Anne Murphy
Charlita A. Nachtrab
Mary Naunton
Jean Nelson
John Nelson
Mary Nelson
Louise Neuert
Jennifer Newman
Ernest Newton
Herta Newton
Edwardine Nodzenski
Sandra Nuckolls
Dorothy Oliver
Lorain Stephens Olsen
Forman Onderdonk
Joan Opila
Marianne O'Shaughnessy
Gary M. Ossewaarde
China Oughton
Anita Padnos
Michelle Parker
Raymond Parker
Frank M. Paulo
Christine Pavel
Dagmar Persson
Mary Anne Peruchini
Trace Petravick
Dorothea Phipps-Cruz
Philip Pinsof
Steffi Postol
Georgianne Prather
Jacquelyn Prine
Martin Pryzdia
Sylvia Rabinkoff
Elizabeth Rada
Lee Rapp
Ann Ratajczyk
Ernest Reed
Sheila Reynolds
Lucille Rich
Elly Ripp
William E. Roder
Mary Anne Rogers
William Rom
Barbara Roob
Beverly R. Rosen
Sarah Rosenbloom
Marie Louise Rosenthal
Anne Ross
Ann Rubeck
Helen Ruch
Lenore Ruehr
Linda Sandberg
Susan Saric
Marian Saska
Everett Schellpfeffer
Marianne Schenker
Sara Scherberg
Sylvia Schueppert
Thelma Schwartz
Jean Seiler
Florence Selko
Jessie Sherrod
Judith Sherry
James Skorcz
Beth Spencer
Irene Spensely
Christopher Spurrier
Llois Stein
Robyn Strauss
Mary Alice Sutton
Gloria Taborn
Elisabeth Taylor
Jane Thain
Lorraine Thauland
Osa Theus
Cathy Tlapa
Mark Tokarz
Ann C. Underriner
Karen Urnezis
Lillian Vanek
Dalia Varanka
Rita Veal
Barbara Vear
Virginia Vergara
Charles A. Vischulis
David Walker
Harold Waterman
Alice Wei
David Weiss
Mary Wenzel
Ann West
Lisa Wibel
James Wilber
Char Wiss
Reeva Wolfson
Zinette Yacker
Laury Zicari

the openings have produced absolutely no evidence of structures closing off the passages.

Many early observers noted the numerous embankment openings and other features that would make Fort Ancient very difficult to defend. Yet the presumably defensive nature of the architecture was never seriously questioned because it was vital to nineteenth-century intelligentsia that the monument be a great bastion of the Mound Builders. When interpreted as a fort, the mesa top earthwork provided tangible proof of the Mound Builder-Red Man wars. This, in turn, confirmed the notion that the noble Mound Builder had been defeated and driven from the land by the savage Indian, who was thus the true scourge of all civilizations, both past and present. "Fort Ancient, which would have held a garrison of 60,000 men, with their families and provisions, was one of a line of fortifications which extended across this state, and served to check the incursions of the savages of the North in their descent on the Moundbuilder's country," is how Professor John T. Short viewed Fort Ancient in his *North Americans of Antiquity* in 1879.

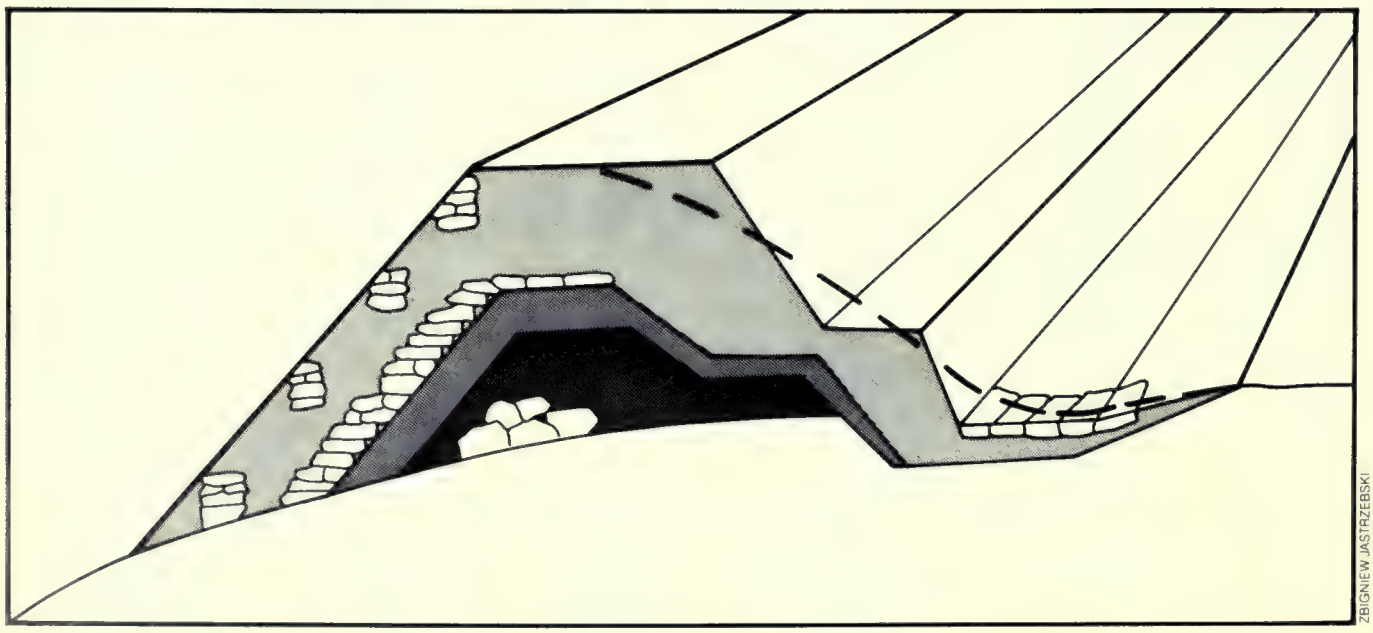
Explorations for the World's Columbian Exposition

In 1887 Warren K. Moorehead, a precocious young man of 21 with a passion for archaeology, began excavating at Fort Ancient. Largely self-taught, Moorehead sold antiquities to support his great passions, which were field work and collecting artifacts. He argued that although many authors had poured out copious thoughts about the great hilltop enclosures, few had ever sunk spade to earth to produce the facts necessary for making sound interpretations. With youthful ardor, Moorhead, set about correcting the situation, and, in the course of four years, spent a total of 43 weeks exploring the monument and digging, both alone and with crews. Although similar to other great enclosures of irregular form built upon high ground, Fort Ancient produced few artifacts of commercial value; but the destitute Moorehead carried out more work at the monument and learned more about it than has any other scholar.

The World's Columbian Exposition was a centennial

Fig. 10 (left). *Partially excavated, stone-faced embankment.*

Fig. 11 (below). *In this drawing of a cross-section through an embankment wall, differential shading shows successive construction stages. Stone was used in several ways: as a rock core, to face the outer slope, and to build short walls for retarding erosion and slumping.*



ZBIGNIEW JASTRZEBSKI

Fig. 12. *The purpose of stone circles such as this one, excavated by William C. Mills in 1908, is unknown, but they are one of the few features discovered in the 126-acre interior of Fort Ancient. Photo courtesy Ohio Historical Society.*

celebration of exploration and development in the Western Hemisphere. To acquire objects, specimens, and materials for public exhibition, the fair occasioned and supported scientific expeditions to explore the ancient civilizations of the Americas. Professor Frederic Ward Putnam of Harvard University was retained to organize and coordinate these expeditionary programs. His long-term vision was singularly important in transforming the exposition into the Field Museum, the enduring world-class museum that Chicago now enjoys. Director of the Peabody Museum of Archaeology and Ethnology, Putnam was a distinguished scholar with wide research experience that included directing field projects at various monuments in Ohio and adjacent states. Because there were no academically trained archaeologists at the time, he retained Moorehead to carry out Mound Builder explorations in Ohio for the exposition. However, the eastern professor was suspicious of the "country boy's" excavation techniques, and demanded both improved note-taking and an end to Moorehead's selling of artifacts.

For the purposes of the 1893 exposition, and central to laying foundations for a great museum, Putnam was concerned with collection building. From his own experience with Mound Builder excavations this insightful scientist knew that the so-called forts, such as Fort Ancient, while architecturally impressive, produced few objects of note. Experience demonstrated that artifacts were more abundant at valley-bottom settlements and at geometric earthworks laid out as complexes of circular and square embankments. Putnam therefore encouraged his young Ohio correspondent to excavate sites producing graves and artifacts.

With this prompting, Moorehead turned his attention to an ancient settlement located on the banks of the Little Miami River immediately below the north enclosure of Fort Ancient. Although artifact accompaniments were neither rich nor common, digging yielded numerous graves, lined and covered with limestone stabs. Moorehead also excavated on the North Fork of Paint Creek, in a complex of geometric enclosures and mounds. He encountered elite burials with truly spectacular accompaniments, ranging from stone pipes sculpted in the form of animals and birds, through fine artifacts chipped from obsidian imported from Yellowstone Park, to elaborate headgear and ornaments fashioned from copper. These magnificent discoveries rank among the finest pieces in the Museum's New World archaeological collections.

The high-yielding complex of geometric enclosures,

Fig. 13. *William C. Mills (left) excavated a number of small mounds at Fort Ancient in 1908 but failed to find the elaborate burials that are typical of geometric Hopewell sites. Here Mills and helpers are investigating a small stone mound near the great crescent. Photo courtesy Ohio Historical Society.*

named Hopewell after the local landowner, became the archaeological type site for an early phase of monument building and occupation in Ohio. The settlement in the valley below Fort Ancient, now known as Anderson Village, became the archaeological type site for the late occupation of the Little Miami region. This occupation, however, is called the "Fort Ancient tradition" because Moorehead and later William C. Mills, who named the archaeological cultures and traditions, wrongly thought that the village was contemporaneous with and a satellite of the great hilltop enclosure. Thus, Fort Ancient the earthwork was built at an early Hopewell date, but mistakenly supplied the name for a late archaeological phase, found at Anderson Village.

Although collections were important to the 1893 Exposition, Putnam was a scholar of perception who also recognized the architectural significance of Fort Ancient and the importance of having an accurate map of the monument. Although Moorehead had previously hired surveyors to plot the ruins, Putnam placed little trust in the accuracy of the measurements and demanded that the monument be professionally resurveyed. Upon completion of his excavations Moorehead turned his notes, collections, and the new map over to the Exposition. Unfortunately, this very important document has been overlooked for decades, and is here published for the first time (fig. 2).

Field studies of the earthworks initiated by Patricia Essenpreis in 1980 have involved systematic "ground truth" checking of the Field Museum's Fort Ancient ground plan. This has entailed confirmation of structural identifications, such as accurately locating openings and assessing their origin: constructed by Hopewell or eroded by nature. The accuracy of the 1891 map and the instrument readings upon which it is based have also been field checked with the assistance of engineer James Marshall. Erosion and poor preservation make measurements on embankment width questionable. In other respects, however, the 1891 survey notes are quite accurate and, as yet, there is no better ground plan of the monument. In the following effort to interpret the monumental architecture, we draw upon the map and its field checking, as well as upon early excavations, to describe the construction and positioning of the embankments and the passages.

The Embankments

There are two distinct classes of embankments. Massive linear "mounds," segmented by passages, define the principal mesa-top enclosures. In contrast, an extremely low, wide, continuous embankment defines the parallel-walled enclosure of geometric form which begins at the Twin

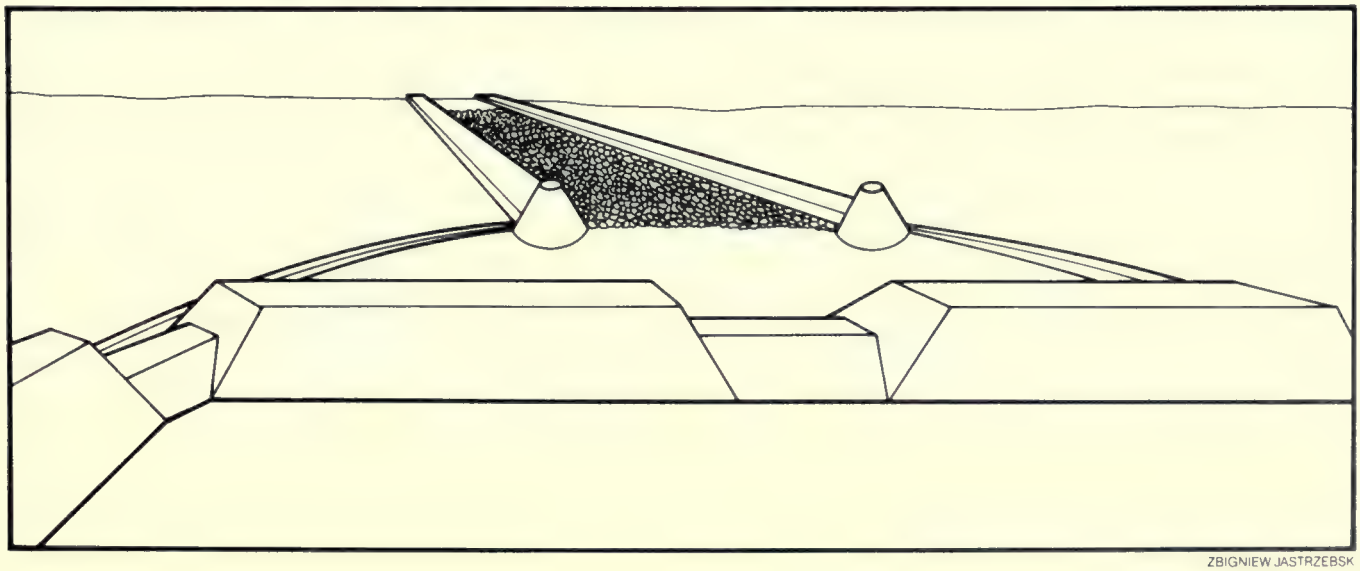
Mounds and extends for nearly one-half mile to the northeast. The segmented embankments of the large enclosures have a total length of 5.7 km, today stand from 2 to 7 m high, have wide, flat summits, and comprise a total volume of construction material variously estimated at 117,500 to 480,000 cubic yards of earth and stone. There are two types of segmented earthworks: contour embankments and straight embankments. The former type contours along the sinuous edge of the mesa and, statistically speaking, comprises the longest embankments with the fewest passage segments. With the most passage segments, straight embankments are wider, higher, shorter, and in layout only roughly approximate the sinuous mesa edge by making sharp, angular bends near ridges and gulleys. The first embankment type was used to build the south and middle enclosures, and sections of the north enclosure, while the second type was employed in constructing the northernmost portion of the monument.

The contour embankments are more eroded and less well preserved than the straight structures. This supports Moorehead's observation that the southern enclosure, which he called "the old fort," was built and used before construction of the northern "new fort." From its layout and outlying positioning, it is evident that the parallel-walled enclosure was erected after the north enclosure. Thus, Fort Ancient encapsulates three stages of an architectural history in which the layout of enclosures progressed from irregular contour embankments, through straight angular embankments, to linear geometric forms.

The differences between contour and straight embankments may include not just preservation and

Fig. 14. *At the Hopewell group, this mica cutout of an eagle claw was found with an elaborate burial over which a mound was later built. Moorehead also investigated the Hopewell group for the Columbian Exposition; many exotic artifacts from this site are on view at the Field Museum. Cat. 110131.*

Fig. 15. *The northeast gateway, with its twin mounds and parallel-walled enclosure, was Fort Ancient's most elaborate gateway. Ditches up to two meters deep connected each twin mound to a stream, funneling traffic along a paved stone walkway between the parallel walls.*



ZBIGNIEW JASTRZEBSK

structural form, but construction technique as well, with a rock core present in the latter but not the former. Moorehead trenched a straight embankment at the north end of the north enclosure, where the earthworks have their longest straightline course. He encountered evidence of multiple construction stages that began with a "core" of large blocks of limestone and sandstone (each weighing 70 kg) that had been "heaped in" with the earth to form the wall base.

In transecting the embankment he also encountered areas of small limestone slabs that had been laid upon or fitted over the exterior face of the earthwork, presumably to stabilize the earthen face which had a slope of 52 degrees. Guarding the inclined earthwork faces against erosion and slumping was, no doubt, a conscious architectural concern. Erosion has largely stripped the original exterior surfaces of the earthworks. Yet, remnants of flagstone facing, in the form of low, masonry walls that were apparently stepped one above another, are not uncommon at Fort Ancient. Structurally, these acted as retaining walls for the earth fill, which had slopes of 35 to 43 degrees on the embankment exteriors. Architecturally, the stone facing and masonry terraces no doubt cast a very impressive if not imposing facade.

A trench through the interior half of a contour embankment in the south enclosure cut in 1940 by Richard G. Morgan of the Ohio Historical Society did not reveal a stone core of the type Moorehead found in the northern straight embankment. Instead the contour earthwork was found to consist of several distinct layers of clay, with clear evidence that these had been deposited there from baskets. The surfaces of some layers appeared weathered, with a thin band of humus capped by clay layers of later construction. During early phases of construction and use, faces of the lower interior embankment faces were nearly vertical and extended down to connect with adjoining moats or ditches. This transect combines with that excavated by Moorehead in indicating that the earthworks assumed their final form through cycles of construction and use.

Ditches, termed moats by early explorers, parallel the interior faces of the large enclosures. Excavation has shown that ditches were often paved with flagstone or gravel. Morgan's 1940 cut revealed substantial infilling with sediments eroded from the adjacent contour embankment. Interestingly, moat fill has produced more artifacts than have larger excavations in the open interior of the enclosure. This suggests that a great deal of past activity went on atop the flat embankment summits.

Passages and Gateways

Our recent field studies indicate 72 embankment openings at Fort Ancient that can be securely identified as architectural features constructed by the prehistoric builders. They average 3 to 5 m wide, and tend to be slightly elevated above adjacent interior surfaces. Topography influenced the placement of both embankments and their openings. The steep sides of the Fort Ancient mesa are cut by deep ravines that alternate with gently sloping ridges. Embankments were erected across the heads of the ravines and systematically block access from the gulleys. In contrast, a majority (45) of the embankment passages were built adjacent to ridges or opened onto terraces and gently sloping land. Moorehead was the first to observe that the ridges served as routes of access, and his excavations showed that some spurs adjacent to passages had been artificially graded and paved with stone slabs. In most cases, openings were not blocked by an interior ditch or moat, and thus they provided passage to the enclosure interiors as well as to the embankment summits.

Although most passages are simply lower sections of the embankment wall, 10 percent are more elaborate. They include complex structures that early explorers called "gateways," although there is no evidence that they were ever closed by gates. The distinguishing feature of gateways is that each side of the passage is demarcated by a mound or by an unusually high section of embankment. The basic pattern is eloquently, but simply, expressed by the twin mounds that form the entrance to the parallel-walled enclosure (fig. 15).

In the main enclosures, the gateway pattern is most often expressed as elevated embankment sections bracketing each side of a major entrance. Significantly, the greatest architectural elaboration occurs in the small middle enclosure that forms the narrow, elongated passage between the large north and south enclosures. Here Moorehead investigated two interrelated complexes that he named the "crescent gateway" and "the great gateway."

The former consists of two low crescent-shaped mounds, each about 10 m long and 1.5 m high, erected a few meters apart, and more or less end-to-end perpendicularly across the narrow isthmus linking the principal enclosures (fig. 17). The convex sides of the crescents face north, and in layout they were apparently designed to funnel traffic moving from north to south through the passage between the mounds. A small circular mound was set within the curve of the east crescent.

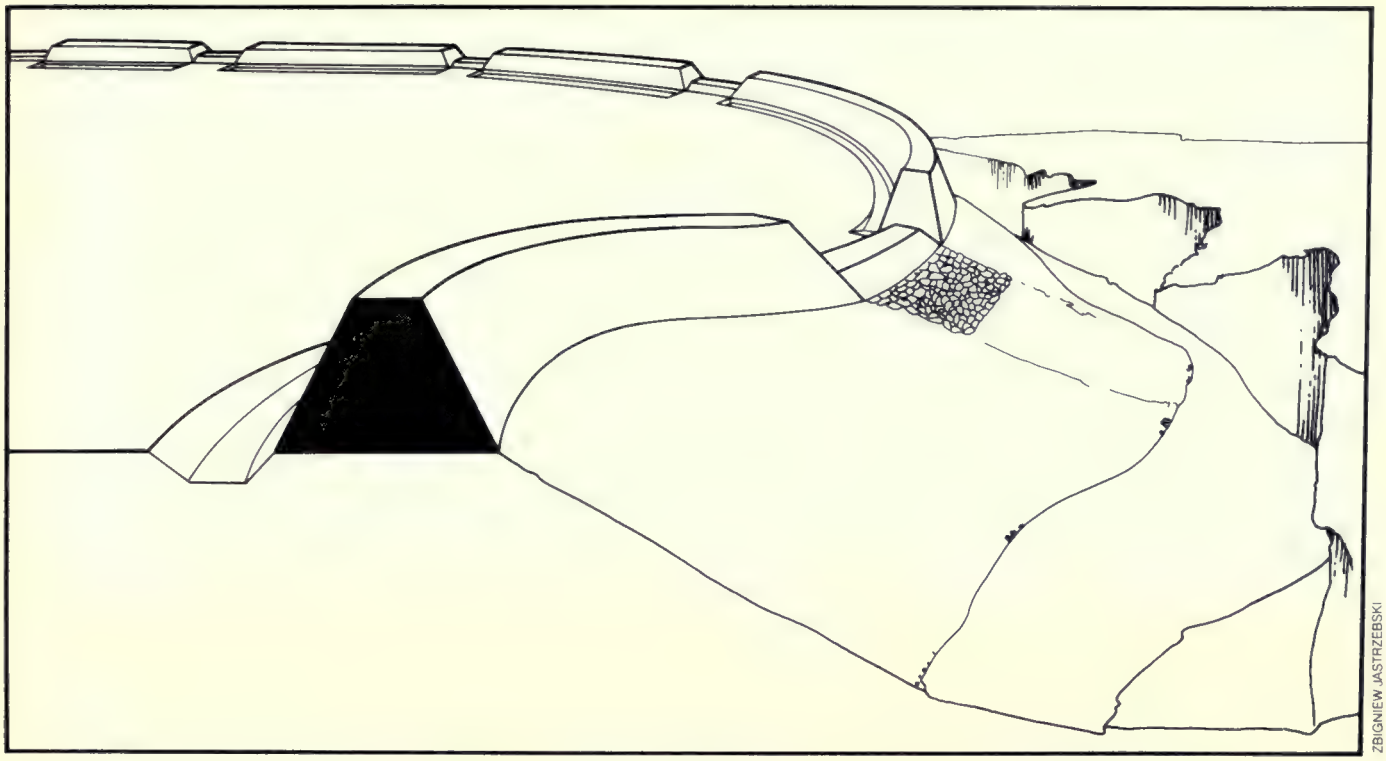
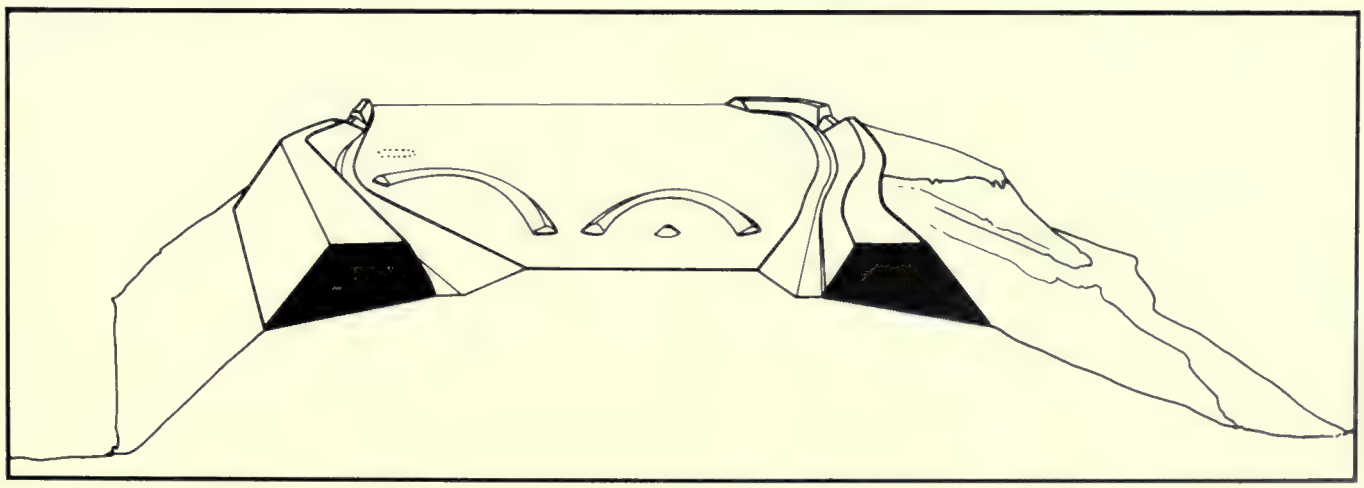


Fig. 16. *Passages opened onto spurs and ridges which were sometimes paved, providing ready access to the valleys below.*

The funneling effect of the crescent gateway brought traffic into alignment with the great gateway, which constituted the principal entrance to the south enclosure. The gateway is formed by two circular mounds, 6 m tall and 3 m apart, that are connected to the adjacent elevated embankments. Passage between the mounds and embankments was across a low platform, 1.2 m. high. On the interior, immediately southwest of the entrance there was a small circular mound connected by stone paving to the nearby embankment ditch (fig. 6, 7). In overview, the great gateway, the crescent gateway and the narrow middle enclosure apparently functioned in concert as an elaborate passageway leading to the southern enclosure. The crescents and mounds are neither high nor suggest that they supported defensive parapets. Rather, as at other early earthworks, they serve to embellish major passageways and distinguish these from the smaller, more numerous entries.

Fig. 17. *The crescent gateway restricted access to the middle enclosure and, with the great gateway, regulated entry into the south, or "old," enclosure.*



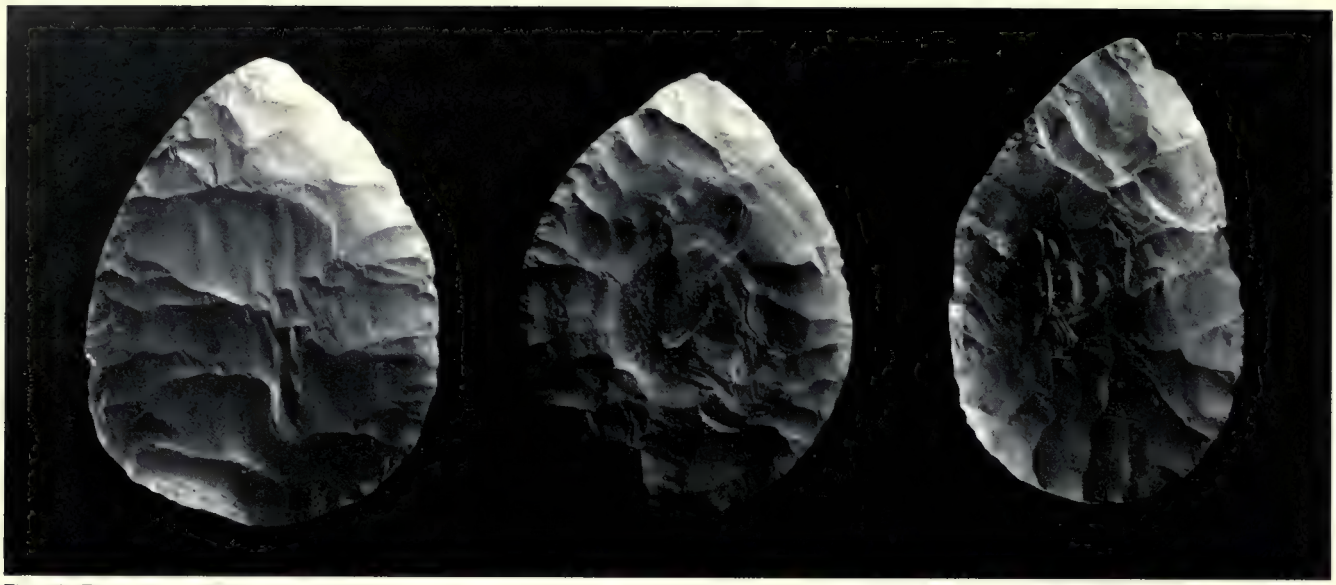


Fig. 18. *These three flint blades (14-16cm long) were part of a ceremonial deposit discovered in a field near the parallel walls. The reason for deliberate burial of exotic goods by Hopewell peoples is not known.*

Conclusions

Commanding a strategic and imposing mesa, Fort Ancient derived its name and its general interpretation as a great bastion from early explorers who explained the vast earthworks in terms of Mound Builder-Red Man wars. Although the Mound Builder Myth fell into disrepute around the turn of the century, the impression that the monument was a fort has been more persistent. This romantic notion, however, is simply not compatible with the architecture of the great ruins. The 5.7 km length of the earthworks creates an enormous and very impractical perimeter that would require tens of thousands of defenders to secure and hold. Yet, there is no evidence of large populations residing within the enclosures.

In publishing the Fort Ancient map commissioned for the Columbian Exposition and in commenting upon its field checking, we have noted that multiple entries and interior moats or ditches are not compatible with achitecture of defensive design. We stress, however, that both multiple embankment openings and interior ditches are found as an interrelated complex of architectural forms at other Hopewell earthworks laid out in the form of geometric circles and squares. The geometric earthworks are interpreted as centers of pageantry and ceremony, and are frequently associated with magnificent ritual artifacts fashioned from exotic materials imported over great distances.

Two caches of such exotic objects have been discovered in the vicinity of the parallel-walled enclosure. One cache contained more than 100 cut sheets of Appalachian mica lying atop 54 ritually destroyed objects of native copper imported from the Upper Peninsula of Michigan. The copper imports include 35 breastplates, 16 earspool fragments, 2 celts (ax heads), 1 reel-shaped gorget (throat guard), and 1 bracelet. A second cache was recently discovered by a local landowner while plowing fields that now overlie the parallel-walled enclosure. It comprised ritual artifacts flaked from exotic stone, including 17 spear points and curved knives of obsidian procured from Yellowstone Park, Wyoming; 11 large ceremonial blades, each approximately 20 cm long, of finely crafted Wyandotte chert acquired from southern Indiana; and 5 magnificent blades, each some 7 cm long, of clear quartz crystal secured from an unknown locality.

We conclude that the exotic caches complement the embankment architecture in removing Fort Ancient from classification as a fort and placing the monument securely within the mainstream of early ceremonial construction. That the vast earthwork served not as a great citadel, but as a colossal coliseum detracts neither from the splendor nor the importance of the monument. It simply indicates that the Hopewell erected one of America's largest monuments, not under duress of war, but in pursuit of religious and ceremonial beliefs similar to those that motivated the major architectural works erected by other great civilizations of antiquity. Exploration of these early Hopewell beliefs and practices forms the current focus of the Field Museum's research at Fort Ancient. FM

TOURS FOR MEMBERS

Archaeological Tour of Peru And of La Paz, Bolivia

October 7 to 24
$3,195

Discover the cultural and natural diversity of Peru (and a little bit of Bolivia too), under the guidance of a Field Museum archaeologist/anthropologist who has lived and worked in that country. Tour participants will be drawn into the fascinating, seemingly alien world of the original inhabitants of the South American continent by walking among the ruins of their once-great cities. Our leader will help you experience much more than what is encountered by the conventional sightseer as you view the incredible wonders of ancient Cuzco, Colonial Lima, and the Inca ruins of Puruchuco. An overnight excursion to the famous "lost city" of Machu Picchu, as well as a visit to the Chinchero Sunday market will be a memorable weekend.

An added bonus will be our pioneering two-day stop at the recently discovered archaeological site in the Moquegua Valley in which Field Museum will play a major research role. We'll complete our tour with a visit to Bolivia, a hydrofoil ride across Lake Titicaca, and a visit to the city of La Paz. Here we'll tour the nearby ruins of the Tiahuanaco civilization. We invite you to join us and to get an insider's view of the past and present.

Our tour leader will be Dr. Robert A. Feldman, research archaeologist for the Field Museum Ancient Irrigation Project and currently director of "Programa Contisuyu." He has done field work in the U.S. and Peru. Before joining the Field Museum project, Dr. Feldman conducted excavations at a 4,000-year-old fishing village on the Peru coast, uncovering some of the earliest monumental architecture in South America.

Ancient Capitals Of China

September 22 to October 13
$3,550

We are pleased to again offer our unique itinerary for China, with the addition of a two-day visit to Wuxi and Nanjing and a Grand Canal cruise from Wuxi to Suzhou. This program also includes the most significant sites of early Imperial China and will provide an opportunity to explore in depth the civilization which characterized one of the oldest and longest-lived societies on earth.

Following our direct flight from Chicago to Tokyo, where we will spend the night, we will visit Beijing for three days, then to Xian for three days. Successive points in the itinerary then include Luoyang, Zhengzhou, Kaifeng, Nanjing, Wuxi, Suzhou, and Shanghai.

Mr. Phillip H. Woodruff, Ph.D. candidate in Chinese history at the University of Chicago, will be our guest lecturer. Mr. Woodruff has recently returned to Chicago after two years of research at Beijing University. His experience of living in China, his fluency in Chinese, and excellent rapport with the Chinese guides are a superb supplement to his leadership skills. This is the fifth China tour he has led for Field Museum.

Kenya

September 8 to 27
$3,595

You are invited to join us for an exciting 19-day safari to East Africa accompanied throughout by Audrey Faden, experienced lecturer and tour guide, plus local guides. Game is still plentiful and this tour is scheduled to coincide with the animal migration. It will be Spring in Kenya. The time to go is now! A trip to Kenya is a vacation that never ends. We hope you will make your reservation now.

Start planning now for...

Tour of Egypt

February, 1985

If you wish to be placed on the mailing list for this perennially popular tour, or if you have questions about any of the other tours, please write or call Tours Manager Dorothy Roder, Field Museum, Roosevelt Rd. at Lake Shore Dr., Chicago, Il 60605. Phone: 322-8862.

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FIELD MUSEUM OF NATURAL HISTORY BULLETIN

July/August 1984

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CONTENTS

July/August 1984
Volume 55, Number 7

July and August Events at Field Museum 3

Books, Business, and Buckskin 5
the life of Edward E. Ayer, Field Museum's first president
by E. Leland Webber, president emeritus of Field Museum

The Search for Paleontology's Most Elusive Animal: The Conodont Animal 11
by Derek E. G. Briggs

Tours for Field Museum Members 26

COVER

Scene at Illinois' Starved Rock State Park.
Photo by John Kolar.

VOLUNTEER OPPORTUNITIES: Do you like to work with children and can give one day a week during the school year? Field Museum's Education volunteers give programs to school groups on everything from dinosaurs to Indians. A background in education or natural history is preferred; a fall training program is required. Year-round Education volunteers are also needed to staff the Place for Wonder and Pawnee earth lodge, weekdays as well as weekends. Weekday volunteers with typing skills are needed in many departments Interested persons should contact Joyce Matuszewich, volunteer coordinator, at 922-9410, extension 360.

PICNIC PLUS THREE
Earth, Sky and Sea
Saturday, August 11, 3:00-8:00pm

Field Museum, Shedd Aquarium, and Adler Planetarium invite you to a summer picnic celebration.

Bring your own food or buy it here—Eat on the lawns—Enjoy special evening hours at each institution. On this occasion your Field Museum membership card admits you free to the aquarium and the planetarium as well.
For additional information please call (312) 322-8859

Events

Family Features—July

African Clay Pots
Saturday and Sunday, July 14, 15
1:00-3:00 pm
Cultures of Africa and Madagascar, Ground Floor

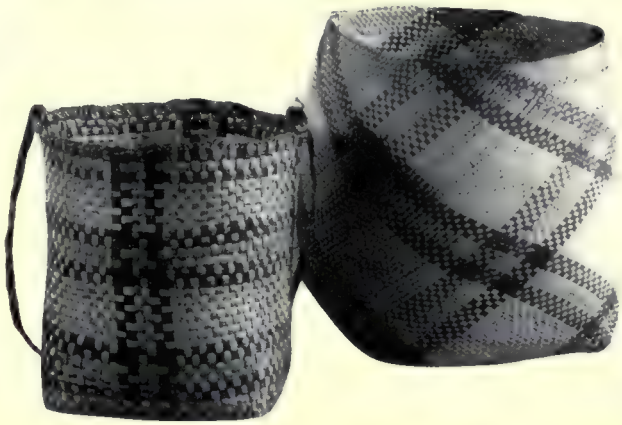
Clay pots are found in African market places in a variety of shapes and sizes. By examining those like the tiny ink pots from Nigeria and the enormous water jugs used in all the African villages, we can learn a lot about the people who made them. Explore the different techniques used to make these African pots and create your own clay pot to take home.

Dahomey Appliqué
Saturday and Sunday, July 28, 29
1:00-3:00 pm
Cultures of Africa and Madagascar, Ground Floor

The Dahomey men of Africa cut symbols from pieces of brightly colored cloth. The symbols were arranged to tell stories about their kings and then appliquéd on cloth. Learn the meanings behind some of these ancient symbols and then create your own story picture.

Family Features are free with Museum admission; tickets not required.

Berry baskets made of red cedar by Tlingit Indians (NW coast).



Family Features—August

Painting with Bone
Saturday and Sunday, August 4, 5
1:00-3:00 pm
Pawnee Earth Lodge, Main Floor

Historical events of the Plains Indians were often recorded in colorfully painted pictographic scenes on animal skins. Printed geometric and symbolic designs richly decorated their clothing, containers, war shields, and drums. Experiment with the traditional painting techniques of the Plains Indians using a real animal bone as your brush for decorating an animal skin robe.

Native American Baskets
Saturday and Sunday, August 11, 12
1:00-3:00 pm
Indians of Western North America Hall, Main Floor

Baskets made by Native Americans are among the most beautiful in the world. Take a look at some Pomo Indian baskets that are big enough to hide in and some that are as tiny as the tip of your smallest finger. Watch demonstrations of different weaving techniques, then try your hand at weaving a basket of your own.

Plains Indian Parfleches
Saturday and Sunday, August 18, 19
1:00-3:00 pm
Indians of Western North America Hall, Main Floor

Plains Indians relied on the buffalo for their subsistence, and travelled constantly to keep up with the herds. Pottery was too breakable to be used for food storage, so they made folded leather containers called parfleches. Look at some of these bags used by the Cheyenne, Pawnee, Sioux, and Crow. Make a parfleche to keep your own travel supplies in, decorating it with the beautiful geometric designs used by these tribes.

These features are free with Museum admission; tickets not required.

CONTINUED⇨

CONTINUED FROM PAGE 3

Events

July/August Weekend Programs

Each Saturday and Sunday you are invited to explore the world of natural history at Field Museum. Free tours, demonstrations, and films related to ongoing exhibits at the Museum are designed for families and adults. Listed are only a few of the numerous activities available each weekend. Check the *Weekend Passport* upon arrival for the complete schedule and program locations. The programs are partially supported by a grant from the Illinois Arts Council.

July

7 11:30 am. *Ancient Egypt* (tour). Investigate the traditions of ancient Egyptian civilization from everyday life to mummification and the promise of an afterlife.

12:30 pm. *African Mammals* (tour). Examine the lifestyles of various African mammals and the adaptations they have made to survive in their harsh environment.

1:30 pm. *Disaster at Pompeii* (slide lecture/tour). Explore the civilization of Pompeii before its devastation by Mt. Vesuvius.

15 1:00 pm. *Welcome to the Field* (tour). Enjoy a sampling of our most significant exhibits as you explore the scope of Field Museum.

21 11:00 am. *African Mammals* (tour). Examine the lifestyles of various African mammals and the adaptations they have made to survive in their harsh environment.

1:30 pm. *Red Land/Black Land* (tour). Tour the Egyptian exhibit focusing on the geography of the Nile Valley and the effect it had on Egypt.

28 12 noon. *Disaster at Pompeii* (slide lecture/tour). Explore the civilization of Pompeii before its devastation by Mt. Vesuvius.

August

4 11:30 am. *Ancient Egypt* (tour). Investigate the traditions of ancient Egyptian civilization from everyday life to mummification and the promise of an afterlife.

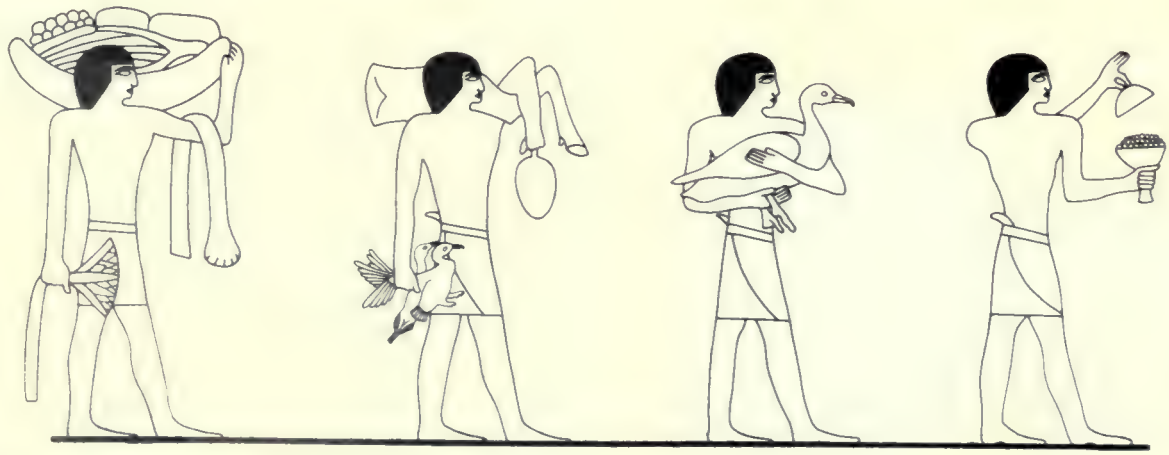
5 1:00 pm. *Welcome to the Field* (tour). Enjoy a sampling of our most significant exhibits as you explore the scope of Field Museum.

12 2:30 pm. *China and the Silk Roads* (tour). Travel the great caravan routes and follow the course of empires, arts, and faiths.

18 1:30 pm. *Treasures from the Totem Forest* (tour). An introduction to the Indians of British Columbia and southeastern Alaska, and the totem poles and masks so important to their cultures.

19 1:00 pm. *Welcome to the Field* (tour). Enjoy a sampling of our most significant exhibits as you explore the scope of Field Museum.

26 1:00 pm. *Traditional China* (tour). Examine the timeless imagery and superb craftsmanship represented by Chinese masterworks in our permanent collection.



Books, Business, and Buckskin

by E. Leland Webber
President Emeritus of Field Museum

Painting (detail) by unknown artist of Edward Ayer in living room of his Lake Geneva home, surrounded by memorabilia of his travels and his beloved books. Most of his books are now in the Newberry Library. The thousands of archaeological and ethnological artifacts he collected in his world travels are now for the most part in the collection of the Field Museum.

Any great American city is the result of the work of generations of committed visionaries. Some build only in the industrial and commercial realm. Others contribute in the nonprofit sector. But the great builders we usually recall are those who make their money in the business world and then through contribution of time or money, or both, work to build the city outside of their day-to-day business life. In Chicago we quickly think of the University of Chicago

"Books, Business, and Buckskin" is adapted from an address recently given by E. Leland Webber before Chicago's Fortnightly Club.

The author and the editor are particularly grateful to the staff of the Newberry Library for assistance in researching the life of Edward E. Ayer and for making available previously unpublished photos. A main source of information on Ayer's life was The Life of Edward E. Ayer, *by Frank C. Lockwood, published by A. C. McClurg & Company, 1929.*

and John D. Rockefeller, Walter Newberry of the Newberry Library, the Field Museum and Marshall Field, the Museum of Science and Industry and Julius Rosenwald, and so on across the rich fabric that makes Chicago one of the world's great cities.

Ayer, left, as a young man, possibly in the Utah quartz mine where he worked briefly in 1860. Photo courtesy Newberry Library.

There are also those who don't leave their name on an institution, but in some respects have had a more profound effect on the city than some whose names have been institutionally perpetuated. So it is with Edward Everett Ayer, one of the really remarkable men in our city's history. A trustee and builder of the Field Museum, Ayer was one of the world's great collectors. Even during his lifetime, the Field Museum was a principal beneficiary of Edward Ayer's zealous collecting — an activity that served to inspire many of his contemporaries to do likewise. He is also to be remembered as a generous donor of funds to the Museum. Other Chicago institutions that benefitted from Ayer's largesse as well as his guidance include the Newberry Library, the Art Institute of Chicago, and the Chicago Historical Society.

Ayer was born in Southport, now Kenosha, Wisconsin in 1841. In 1846 his father, Elbridge Gerry Ayer, bought 200 acres of land 30 miles west of

Kenosha, and established a combination general store and blacksmith shop. By the mid-1850s the Chicago and Northwestern Railroad was building a line northwest out of Chicago, eventually to reach Williams Bay, Wisconsin, and beyond. Elbridge Ayer, seeing an opportunity, sold his store and land, bought 400 acres five miles south and in 1856 laid out the town of Harvard, Illinois. The railroad soon came, Ayer prospered, and he became a leading citizen of that rural part of Illinois south of Lake Geneva.

His son, Edward, in the meantime, lived a typical rural life. He was no student, apparently loathing the "3 R's" that were the curriculum of the day; he attended school only three months or so a year until he was eleven or twelve. He then worked on the farm, took wagon trains of grains to Kenosha, and generally helped his father in business. At 18 he caught the wanderlust and in April 1860 with his father's permission, set out for California. He joined a wagon train, but left it in Utah to work in a quartz mine, 11 hours a day for $4, staying only long enough to save the fare to San Francisco. He arrived there five months after leaving Illinois, with only 25¢ in his pocket, and obtained work sawing wood with a bucksaw.

Meanwhile, the Civil War had broken out. California joined the Union and young Ayer enlisted in August 1861 in the first California unit—a cavalry company—to be sworn into service. By the following spring, Ayer's company was assigned to southern Arizona, and Ayer was put in charge of a detail to protect a mine near the Mexican border. How often fate, or chance, intervenes in a small incident that may literally change our lives. This is what happened to Ayer at the mine. In the small library set up for the use of mine employees, Ayer came upon William H. Prescott's *The Conquest of Mexico*. Until this time, Ayer had never read a book in his life. He later wrote, "I read those three volumes of Prescott's through twice while I was at the mine. They seemed to open an absolutely new world to me." What they did was nothing less than change the course of Ayer's life—gave him a love of books, an opening of the intellect, and coupled with his war travels a life-long love of the American West and its history.

To emphasize this incident, I shall move the nar-

Early engraving of Cerro Colorado Mine, near the Mexican border, where Edward Ayer was stationed for several months during the Civil War.

rative forward about two years: A month after Ayer's discharge from the Army, he walked into a Chicago bookstore and asked for *The Conquest of Mexico.* (Ayer had still read no other work.) The bookseller brought out an 1864 edition in five volumes, containing not only *The Conquest of Mexico* but also Prescott's *The Conquest of Peru.* "How much are they?" "$17.50." "What?" Ayer responded. "$17.50," came the reply. "I'm so disappointed. I didn't think they could be more than 50¢ a volume." Ayer was desperate; he wanted those books more than he had ever wanted anything in his life. Finally he said, "My name is Edward Ayer. I have been four and a half years on the Plains and in the war three years. I just got back a month ago after four years among the Indians. My father has given me a $1,000 interest in his store at Harvard Junction. I want that first volume on Mexico awfully bad, and if you will let me have it, I will pledge myself as a gentleman and economize and save $3.50 a month, and in five months I will have paid for the rest." The bookseller looked at Ayer a moment and replied "Young man, you can take the whole set right home with you. Give me $3.50 now and $3.50 each month until they are paid for." Of all the things Ayer later owned in life, those five volumes remained his greatest personal treasure.

Now, back to the Southwest and the war. Ayer spent the next two years in Arizona, New Mexico, and northern Mexico, and he saw much of the region from northern Mexico to Santa Fe and Indian pueblos. It was life in the saddle, often requiring rides of several hundred miles, and was one of those periods in life that was certain either to enchant or repel. Enchant young Ayer it did; he acquired a life-long absorption with the West and a passion for travel.

The adobe building at Cerro Colorado Mine, where Ayer was introduced to Prescott's The Conquest of Mexico. *The first book Ayer ever read, he later credited it with radically influencing his life.*

A commission came in 1863, discharge the next year. The $400 fare back to Chicago, new clothes, and unexpected delays en route combined to leave Ayer with $1.80 in his pocket as he arrived in Chicago. A friendly railroad man gave him a pass to Harvard, and on July 1, 1864, Lt. Ayer returned home.

Ayer, Sr. gave a one-third interest in his store to his son, but storekeeping was too confining, and Edward soon began buying timber lots to supply cordwood for the wood-burning locomotives of the Chicago and Northwestern. In a year or two he was employing 60 or 70 woodchoppers. In 1867 he contracted with the Chicago and Northwestern to supply 60,000 railroad ties and obtained another contract with the Union Pacific, which was pushing for

a transcontinental tie-up (achieved in 1869). His life's work was set and his fortune ensured. By 1871, at the age of 30, young Ayer was selling almost a million ties a year, travelling almost incessantly, and spending nearly half of the nights a year on Pullman sleepers.

Fortunately, Ayer had time for some romance before he got into the railway tie business and began his travels. In September 1865 he married Emma Burbank, a young lady who had been brought up in the East and was well educated for a woman of that time. The marriage was of two people with remarkably similar interests and abilities, and was to last more than 60 years. Within five years of his marriage, Ayer was well established in his career and, while not rich, was well enough off to pay attention to matters other than railroad ties. About 1871 he went to Denver and Omaha, where he bought a great deal of Indian beadwork and garments. In 1880 he again visited the Plains, saw the striking changes in Indian life and began urgent collecting of Indian material—from Mexico, the Southwest, the Plains, the Northwest Coast, and even Alaska. He also began buying books about Indians, an interest that expanded to include original source material — manuscripts, maps, paintings, drawings, and pamphlets—about the early history of America. The Indian collection later went to the Field Museum and the books and associated materials to the Newberry Library.

Edward E. Ayer in about 1880. He was already a successful businessman. Photo courtesy the Newberry Library.

But Ayer was not just a collector of things. He read his books and he read broadly. While travelling on the Pullman he read omnivorously, seemingly frantic to make up for the education he had missed. Shakespeare, Burns, Scott, Thackeray, Dickens, Cooper, Holmes, Gibbon's *Decline and Fall of the Roman Empire* and *The Conquest of Granada*; Allison's *History of England* in 31 volumes; the *Iliad* and the *Odyssey*; Plutarch's *Lives*—all of these acquired before he was 40 and read as he travelled the rails.

Ayer made a lot of money, but apparently he did not aspire to immense wealth. He had opportunities to branch out, to speculate, but he seems to have been one of those who prefer to do a few things superbly

Sawmill built by Ayer at Flagstaff, Arizona, in 1882.

rather than many things well, regardless of the financial opportunities lost. The following vignettes may further illuminate the character of the man:

The Mexican Central Railroad, begun in 1881, was laying track simultaneously southward from El Paso, Texas and northward from Mexico City, and for this project Ayer secured a contract for 70,000 ties. He delivered, the ties were selected and approved by a railroad company representative. But subsequently the railroad's chief owner wrote from Boston to complain of the quality and performance of the contract. Ayer responded, sending a copy of the contract and pointing out that the railroad's own inspector had approved the ties delivered. He felt blameless and under no legal obligation, but wrote that he would honor any draft in adjustment drawn against him. The draft came through and Ayer paid. Thereafter, every tie used in the building of the Mexican Central, some six or seven million, was supplied by Ayer, in addition to lumber for bridge construction, depots, and other purposes.

In 1882 the Santa Fe Railroad gave Ayer an option on 87 square miles of land south and west of Flagstaff, Arizona. He went out to look. The railroad had stopped at Winslow until a bridge across Canyon Diablo — an open truss structure 541 feet long and 223 feet high — could be completed. Ayer surveyed the area on horseback and determined that he had to build a sawmill on the other side of the canyon to supply ties and telephone poles for completion of the Mexican Central and the extension of the Santa Fe to California. Forty-five years later, A.G. Wells, a Santa Fe vice president wrote:

> The erection of the steel (for the bridge over Canyon Diablo) delayed track laying for six months. This delay to his operations did not harmonize with Ed Ayer's conception or the fitness of things. There was timber waiting to be cut, and the machinery for the sawmill on cars at Canyon Diablo. With characteristic energy Mr. Ayer imported men, teams, wagons, and commissary, brought his mill stuff across the canyon, and installed it, and put it into operation long before the first locomotive whistled into Flagstaff, and this through a country uninhabited and which did not afford a drop of water for men or mules.

As his drive and integrity increased his wealth, Edward Ayer had more time to travel, visiting Mexico more than twenty times and travelling constantly through the Southwest. In the mid-eighties he made his first trip to Europe, and for the next quarter-century spent about three months a year abroad. Europe, North Africa, the Middle East, and eventually around the world Ayer and his wife went, often with their friends, the Martin Ryersons, the Charles Hutchinsons, the Daniel Burnhams, the Wells,

Continued on p. 19

THE SEARCH For Paleontology's Most Elusive Entity: The Conodont Animal

By Derek E. G. Briggs

Much of the excitement of paleontology lies in collecting fossils. It is akin to searching for buried treasure; the bounty beautiful to look at, and highly coveted by other collectors. Even more exciting is the possibility of discovering something rare or unusual—perhaps even new to science. If you take your prize specimen to the museum for identification, more often than not the curator will show you a drawer full of them—or at least produce an illustration in some scientific monograph. Occasionally, however, you hit the jackpot—like the many collectors of Mazon Creek* fossils who have generously donated specimens for scientific study over the years. But did it ever occur to you that collecting in the field is not the only way to find fossils new to science? Sometimes, already found and stored away in museum collections, they may remain for years before being recognized as previously unknown. This happens even in the best curated collections of museums and other research institutions, until somebody stumbles upon them almost by accident.

Museum collections are not only repositories for "type" material, those specimens upon which the original description of a fossil was based, nor are they just reference collections to aid in the identification of fossils brought in by collectors. They are also warehouses, storing important material until the day when it is needed to test a new idea or theory, or to yield new information to a different approach or more advanced technique, or simply until the manpower is available to go through the time-consuming processes of preparation, description, and interpretation. Two unique specimens, central to the development of our understanding of an important group of microfossils called conodonts, were discovered in collections in this way.

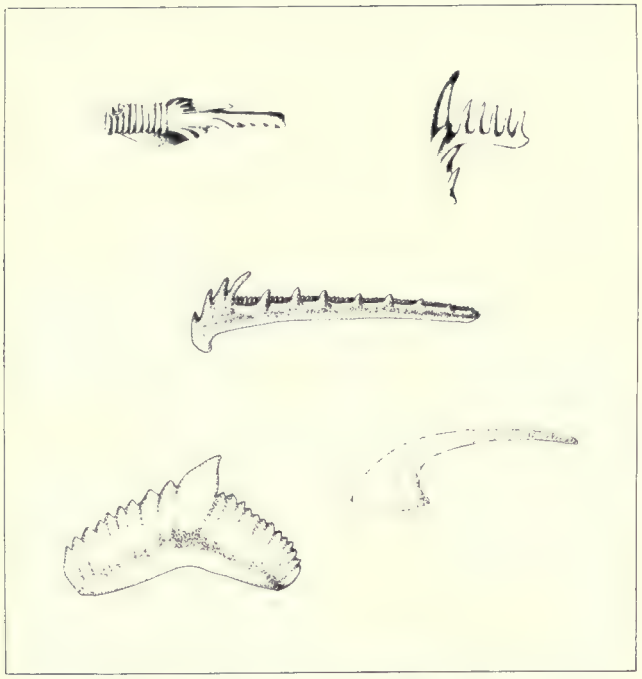
The origin of these toothlike microfossils has been one of the longest standing puzzles in paleontology since they were first reported over 125 years ago. Conodonts occur in rocks ranging in age from Cambrian (about 520 million years ago) to Triassic, a total span of about 300 million years; they became extinct about 200 million years ago. They are usually extracted by dissolving limestones which contain them in acetic acid. The conodonts are composed of a phosphatic mineral which is more acid-resistant than the rock and they are picked from the residue by means of a fine brush. During the last 25 years detailed sampling and documentation have shown that conodonts evolved relatively rapidly; therefore, they are good index fossils for correlating rock sequences in different areas. That is, they are useful in biostratigraphy. Until very recently, however, the soft parts of the animal to which conodonts belonged were unknown. Indeed, Klaus Müller of the University of Bonn noted in the revision of the conodont section of the *Treatise on Invertebrate Paleontology* published in 1981 that "The origin of conodonts is considered by many paleontologists to be one of the most fundamental unanswered questions in systematic paleontology."

A lack of information regarding the nature of the conodont animal has been little hindrance to using conodonts in correlating rock sequences. For the most part, they might as well be nuts and bolts, provided each type is confined to a different segment of time as represented in the rock record. A knowledge of the biology of fossils used in correlation is useful, however, to provide some indication of likely controls on their distribution and occurrence in different sedimentary rocks. In addition, the majority of paleontologists are interested in evolutionary biology as well as in biostratigraphy so, as conodonts have become more useful, speculation about their affinities has increased.

Conodonts were discovered, and documented for years, as isolated individuals — or elements, as they are now called. Each type of element was described as a sepa-

*Mazon Creek is a world-famous fossil occurrence an hour's drive southwest of Chicago.

Derek Briggs is a principal lecturer in geology and deputy dean of science and mathematics at Goldsmiths' College, University of London. He recently spent several months at Field Museum under the Department of Geology's Visiting Scientist Program, investigating exceptionally preserved fossil faunas and giant extinct arthropods.



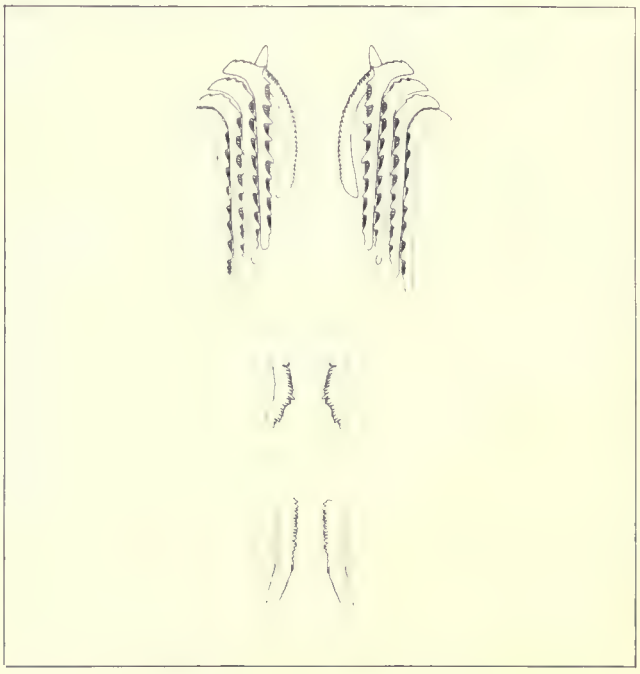
A selection of conodonts, showing diversity of form. About 17X.

rate species, and a system of classifying these species into genera, families, and orders was developed. A major breakthrough in our understanding of conodonts came in the 1930s with the independent discovery by H. W. Schmidt in Germany, and Harold Scott at the University of Illinois, Urbana, of groups of different conodont elements preserved in a bilaterally symmetrical arrangement. It then became clear that each conodont animal included an assemblage of several different elements making up an apparatus—a number of different conodont species and genera, as previously defined, actually belonged to the same organism. These groups were found in black shales—fine-grained sedimentary rocks laid down in very quiet water—so that decay of the soft tissues had taken place, leaving the conodonts in their original position and undisturbed by water currents.

This discovery, fifty years ago, that individual conodonts were arranged in an apparatus, was the first milestone in the search for the conodont animal and ultimately led to a change in the method of classifying conodonts; conodont species are now based on apparatuses rather than individual elements. The reconstruction of conodont apparatuses did not, however, provide any clue to the nature of the animal to which they belonged. Conodonts have been variously attributed to a whole variety of groups, from plants through a range of minor invertebrate phyla to the molluscs, annelid worms, lophophorates, arrowworms (chaetognaths) and vertebrates (including the gill supports or teeth of different kinds of fish). The difficulty paleontologists have experienced in finding a taxonomic "home" for the conodonts emphasizes their uniqueness. Structures similar to the conodonts are unknown in any living group of animals.

A second milestone in the search for the conodont animal seemed at first to confirm that conodonts are a unique group. In the late 1960s Bill Melton of the University of Montana discovered an extraordinary animal in the Carboniferous (about 320 million years old) Bear Gulch Limestone of Montana. The specimens show a long, flattened, cigar-shaped body with a finlike structure at the posterior end; in the central part of the animal conodonts were found. Melton brought his fossil to the first North American Paleontological Convention (N.A.P.C.), which was held at the Field Museum in 1969. There it was shown to Harold Scott who 35 years earlier had described the first conodont assemblages discovered in North America. Scott considered that the elusive conodont animal had at last been found, and his informal announcement was surely the sensation of the meeting. Believers and skeptics alike stood in long lines for a view of the fossil under a microscope. One evening during the convention the event was

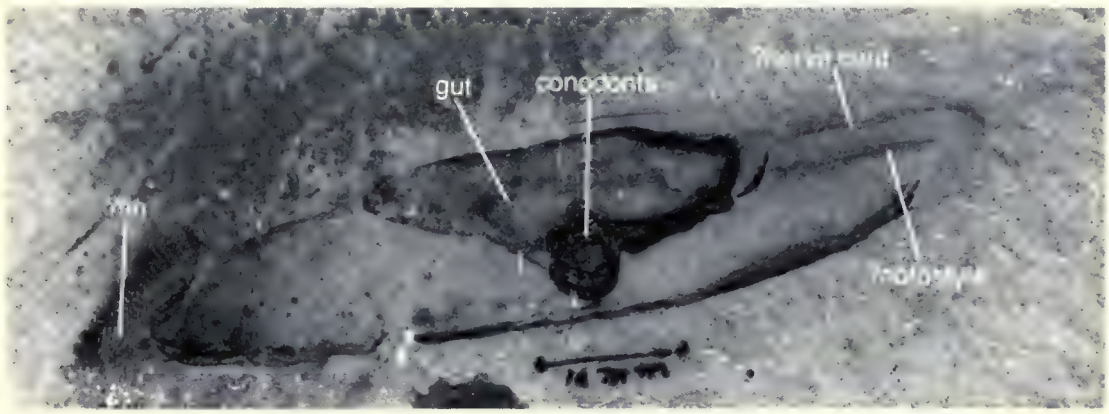
A Carboniferous conodont apparatus. The comblike elements at the front are followed by a pair of flat, 'arched blade' elements, then a pair of stout platform elements. About 17X.



immortalized in a song composed by Tom Dutro and Mackenzie Gordon, Jr., of the U.S. Geological Survey:

> Ah, sweet mystery of conodonts, I've solved thee!
> So you really had a body after all.
> It was firm and roly-poly, flat and flabby;
> 'Twas like a worm, echinoderm, or jelly ball.
> Now the guessing game is over and we're certain
> You were sexless, winged, six-sided, more or less.
> Did a notocord support your velum curtain?
> Yes, we're certain you were just a mess!!

Melton and Scott cooperated in studying the Bear Gulch discovery, but their full description was not published until 1973. They were impressed by linear structures at the front of the animal which they interpreted as a nerve cord and notostyle, characteristic features of a chordate. They therefore called the animal a conodontochordate.



The conodonto-chordate from the Bear Gulch Limestone of Montana. About 2X. Photo by S. Conway Morris. University of Montana collections, UM 6027.

Unfortunately the reign of the conodontochordate as conodont animal was short-lived. Although an alternative interpretation was suggested by some paleontologists from the outset, it was left to Simon Conway Morris of the University of Cambridge to restudy the specimens and demonstrate the true nature of the conodontochordate. The gut of some of the specimens contained a mixture of different conodont apparatuses, others included structures such as possible worm jaws, still others revealed no conodonts at all. The conodontochordates had clearly been feeding on conodont animals — surely one of the most unfortunate examples of carnivory in the annals of paleontology.

Although the Bear Gulch fossils are not the elusive conodont animal, their discovery is of outstanding importance nonetheless. They are representatives of a totally distinct body plan with no living relatives. Melton and Scott had discovered a new extinct phylum! There is now good evidence that the major radiation of life in the seas during late Precambrian and early Cambrian time (around 590 million years ago) gave rise to a great many more phyla than are present today. Their number was gradually reduced by extinction through geologic time. Many of these now extinct early phyla are preserved at a world-famous fossil locality of middle Cambrian age (*ca.* 540 million years), the Burgess Shale in southern British Columbia. The locality was discovered by Charles Walcott, secretary of the Smithsonian Institution, Washington, D.C., in 1909. Walcott's unrivalled collection of more than 60,000 specimens, which was amassed over a period of several years, is held by the National Museum of Natural History in Washington. It was while working through Walcott's collections that Simon Conway Morris discovered a unique fossil which was to prove a third milestone in the hunt for the conodont animal.

The specimen discovered by Conway Morris is a wide, flat animal about 6 cm long with an annulated, or ringed, trunk. In the head region a small central horseshoe-shaped outline around the mouth is defined by cone-shaped structures which resemble some Cambrian conodonts and conodontlike microfossils. Conway Morris named the animal *Odontogriphus*, "toothed riddle," and suggested that it is an example of a conodont animal. Unfortunately no skeletal material has survived and the cones are preserved only as impressions—their true nature cannot be determined. Conway Morris interpreted the cone-shaped structures in *Odontogriphus* as supports for the soft tentacles of a feeding device, or lophophore, around the mouth. *Odontogriphus* may belong with other groups

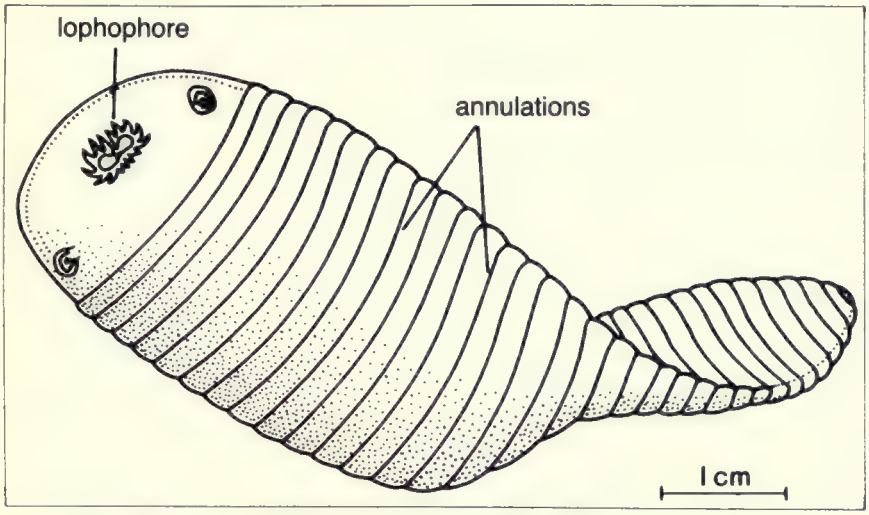
which have a lophophore such as the bryozoans (moss-animals) and brachiopods (lampshells).

True conodonts, or euconodonts, do not appear in the fossil record until the upper Cambrian (about 520 million years ago), after *Odontogriphus*. Two similar groups of microfossils, protoconodonts, and paraconodonts, appear earlier than *Odontogriphus* in the late Precambrian (about 600 million years ago). Both are essentially simple cones, but Stefan Bengtson of the University of Uppsala has shown that they can be distinguished from each other and from true conodonts by their microstructure and the way they grow. Paraconodonts may be ancestral to true conodonts, but protocondonts are different. Thus, as long as the nature of the cone-shaped structures around the mouth of *Odontogriphus* remained uncertain the possibility of a relationship to true conodonts could not be verified. The search for the true conodont animal was still on, and the likelihood was that it would look different from *Odontogriphus*.

Walcott Quarry, the world-famous Cambrian fossil locality in Yoho National Park, British Columbia. Mt. Wapta (2,779 m) in background. Photo by D. Briggs.

The fourth and most recent milestone in the search for the conodont animal was the discovery of a specimen in the collections of the Institute of Geological Sciences in Edinburgh, Scotland. The Scottish animal, like *Odonotogriphus*, awaited discovery in an existing collection, and both are known only from single specimens, but there the similarity ends. Euan Clarkson of the University of Edinburgh and I have been working for several years on well preserved fossil shrimps from the Carboniferous (about

340 million years old) of southern Scotland. One of our localities is actually within the boundaries of the city of Edinburgh, along the Firth of Forth at Granton. Here a thin unit of laminated limestone yields a variety of shrimps, one of which, *Waterstonella*, is abundant and



Reconstruction by S. Conway Morris of Odontogriphus *from Walcott Quarry, Yoho National Park, British Columbia, showing lophophore around mouth, with tentacles supported by about 25 cone-shaped structures. About 1.7X.*

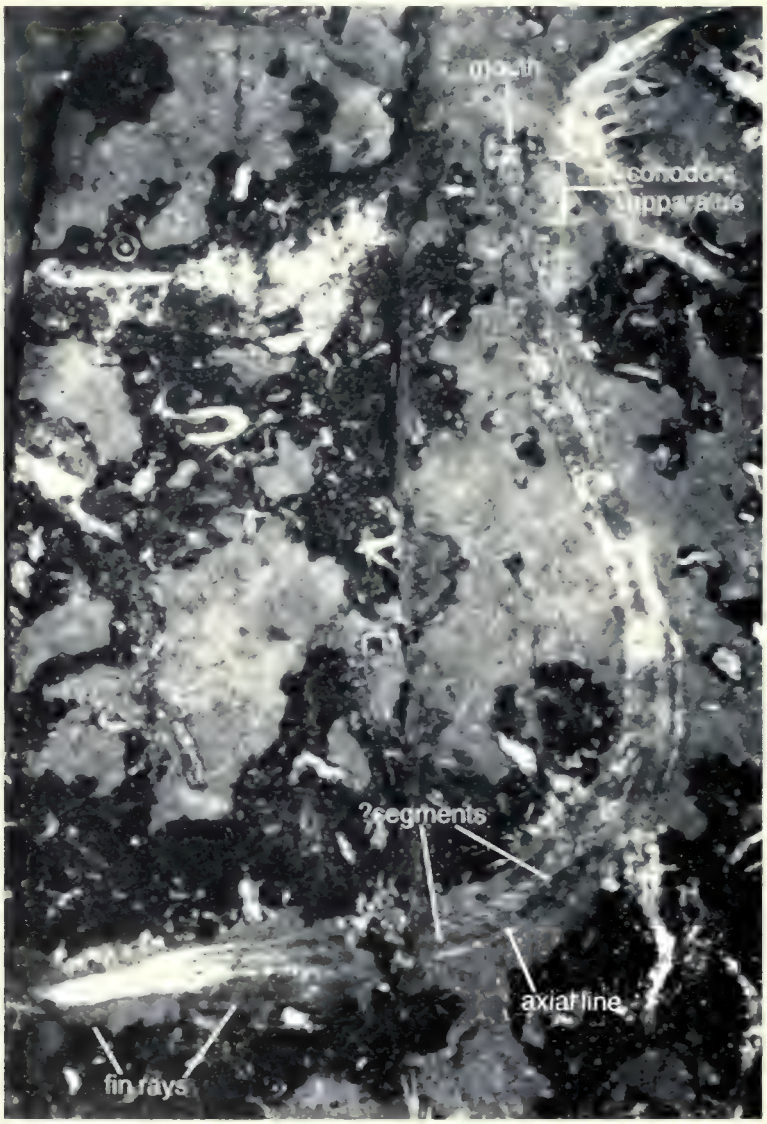
known only from this immediate area. In addition to the shrimps we have found branching organisms (which are probably hydroids), worms, and rare nautiloids and fish. The conodont animal specimen came to light while Clarkson was searching the collections from the same locality in the Institute of Geological Sciences for well preserved shrimps and examples of the other animals which occur with them. It wasn't immediately obvious what had been found, but the wormlike fossil which had probably been collected by a survey geologist, D. Tait, in the 1920s, clearly was not a shrimp.

Although the specimen is 40 mm (1.6″) long, it is only 2 mm wide, so the details only became apparent under a microscope. It is easy to distinguish front from rear, however, as along the margin at one end are a row of parallel lines which clearly must have been some kind of rays that supported fins. At the anterior end are the conodont elements, just behind two lobes flanking the mouth.

Complete assemblages of conodont elements of about this age were well known long before the Edinburgh discovery. Was the arrangement in the soft-bodied fossil the same? Most Carboniferous apparatuses are made up of a pair of stout elements known as platforms, followed by a pair of flat 'arched-blade' elements and finally a group of eight to ten comblike elements which were normally considered to lie at the rear. In our animal the sequence is reversed, the comblike elements are first, followed by a pair of arched-blade elements, one on each of the opposing slabs (part and counterpart) which separated to reveal the fossil. The platforms were not obvious, however, although the broken ends of two structures were evident in about the expected position. Could we demonstrate that a normal apparatus was present? Very early one spring morning in 1982, shortly after I first saw the specimen, I trimmed a fine paint brush down to one or two bristles and, working with a microscope, applied a tiny drop of weak acid around the poorly exposed conodont elements, painstakingly removing grains of the surrounding matrix with a needle. It proved possible to expose sufficient of the conodont to show, without doubt, that they were indeed the expected platforms, although precisely which species they belong to remains uncertain. Clarkson and I had an apparatus in the expected position at the front of the specimen!

The evidence was good, but two other possibilities had to be eliminated before we could be confident that we had indeed found the long-sought conodont animal. Could the presence of the conodonts be simply the result of an accidental superimposition—a conodont animal lying on top of some other wormlike fossil? This seems unlikely; there is no sign of the outline of another creature, and the apparatus is complete and in the expected position

at the front of the animal. If the conodonts have not been superimposed could they perhaps have been eaten? (That, after all, was the fate of the conodonts found in the 'conodontochordate' animal from Montana.) Specimens of fish choking on their prey are known from the fossil record, although such examples of terminal gluttony are very rare.



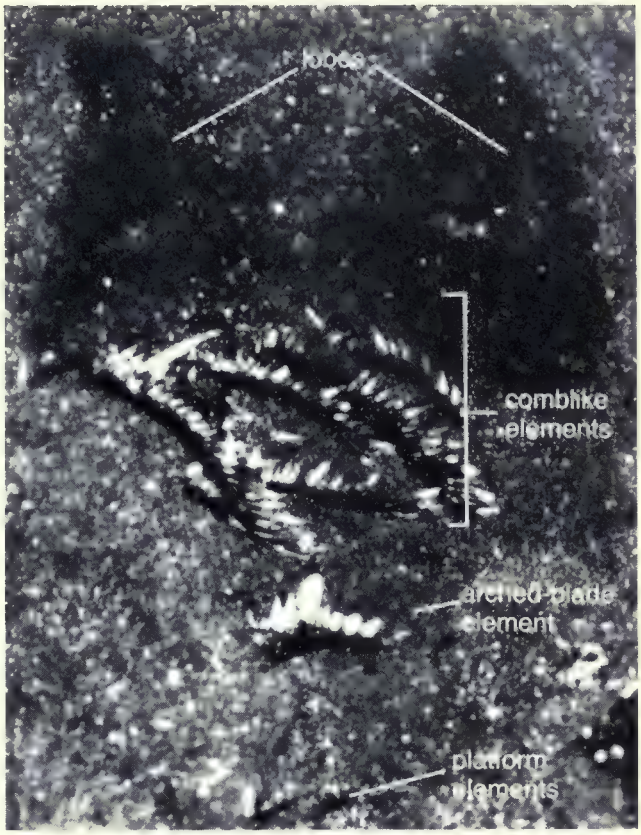
The Edinburgh conodont animal. About 5X. Photo by J.K. Ingham.

There is, in addition, no sign of prey projecting out of the mouth of the Scottish fossil and the chances of such an occurrence getting preserved must be remote. The possibility that the Edinburgh fossil represents either a chance association or a predator eating prey is therefore minimal, but only the discovery of a second specimen can completely rule out either.

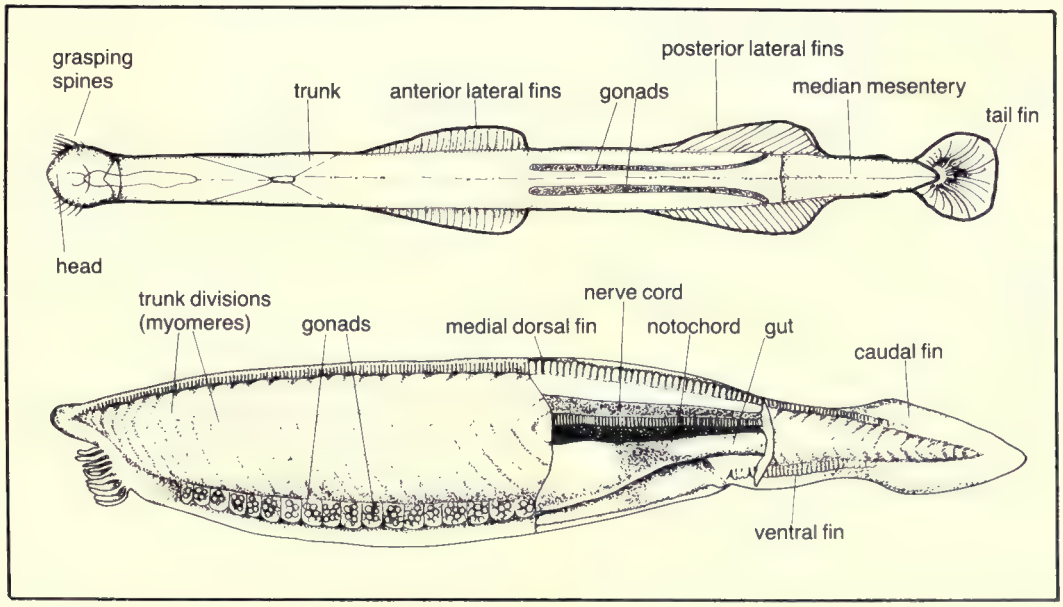
Euan Clarkson and I asked Dick Aldridge of the University of Nottingham, an expert on conodonts, to help us with the detailed study of the apparatus. Paleontologists like Aldridge who work on conodonts (conodontologists as they are sometimes called), have long suffered a kind of identity crisis when faced with the question of what they work on! Would the Edinburgh specimen provide any solution to their problem? The conodont animal is clearly not related to either Melton and Scott's conodontochordate or to *Odontogriphus*. It shows striking similarities to the classic primitive chordate, a little animal called the lancelet, or amphioxus: the flattened elongate body, the trunk divisions, a median line which might be a nerve cord or notochord (characteristic chordate features), and the fins. But chordates are not the only animals with a similar suite of characters. A group of small swimming marine invertebrates, the chaetognaths, or arrowworms, are also

elongate and flattened and have fins. Arrowworms even have a median mesentery which divides the body into two halves and might be represented by the axial line in the conodont animal. And arrowworms have an array of grasping spines in the head region which are very similar to those in Cambrian protoconodonts (although, as already pointed out, protoconodonts may not be related to true conodonts).

Is it possible to decide between a chordate or chaetognath affinity for the conodont animal? Primitive chordates are eellike, *laterally* flattened with vertical fins, whereas arrowworms are *dorso-ventrally* flattened with lateral fins. But it is impossible to reconstruct an extinct animal in three-dimensions on the basis of a single compacted specimen. As a swimming creature with fins, the conodont animal was almost certainly flattened in life, but laterally or dorso-ventrally? — we cannot be sure. The biggest problem of all in determining the relationship of the conodont animal is the conodont elements themselves. Conodonts are unique—if there were any obviously similar structure in a living group there would not have been the wide-ranging debate about conodont affinities, a debate which reached no satisfactory conclusion in over 100 years. Since our work on the Edinburgh specimen was published, early in 1983, the commentators (in print) have fallen into two groups—Stefan Bengtson of the University of Uppsala considers arguments for an affinity to the chaetognaths strengthened; Phillippe Janvier of the University of Paris and Keith Rigby Jr. of Notre Dame University independently favor a chordate relationship. The evidence for either assignment is inconclusive. Conodont elements remain unique to the conodont animal, and we prefer until we have evidence to the contrary, to place the



Head of the conodont animal, showing the conodont apparatus as preserved on the slab opposing that shown in photo on page 16 before preparation in order to reveal the platform elements more clearly. About 23X. Photo by J. K. Ingham.

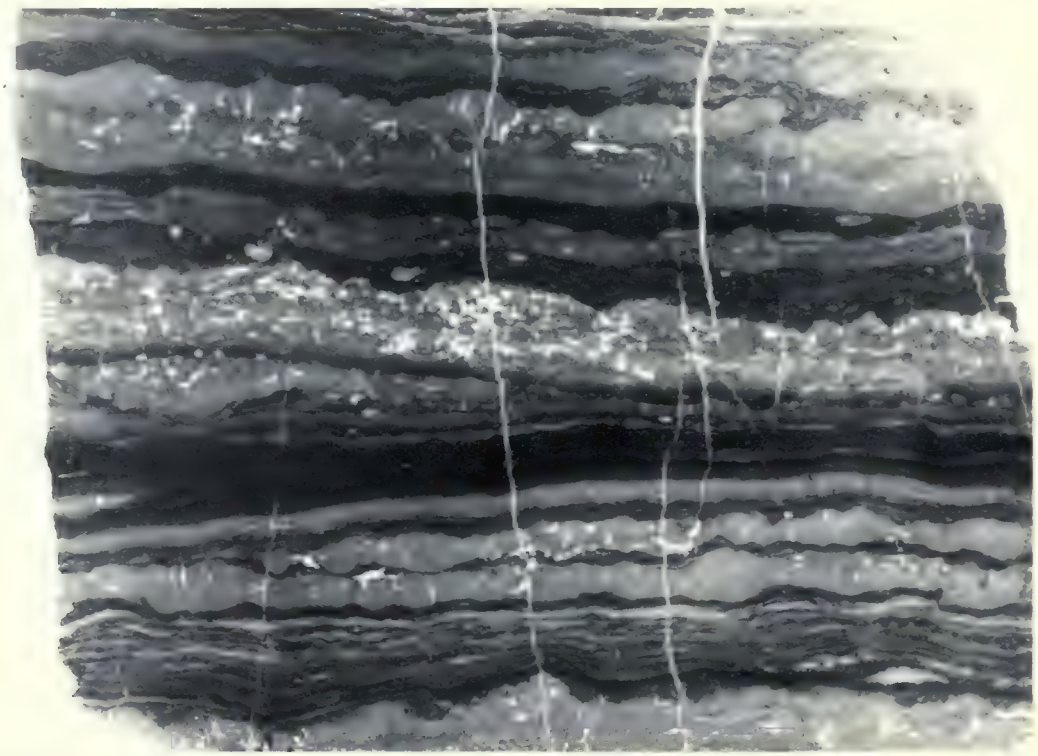


Diagrams illustrating features of two groups which show similarities to the conodont animal. Top: The arrowworm Sagitta, *ventral view. About 2.6X. Bottom: The chordate amphioxus, left anterior view, with a central portion cut away to reveal internal features. About 5X.*

conodont animal in its own separate phylum. Others also favor our interpretation: David Clark of the University of Wisconsin preferred phylum Conodonta in the 1981 revision of the conodont section of the *Treatise on Invertebrate Paleontology* which predated our discovery, and Stephen Jay Gould of Harvard University has endorsed our view in a recent article in *Natural History* (July 1983).

Harold Scott, as already noted, announced the Montana 'conodontochordate' at the first N.A.P.C. in 1969 at the Field Museum. I made the first announcement of the Edinburgh conodont animal on the American side of the Atlantic at the third N.A.P.C. in 1982 in Montreal. My talk was a last-minute addition to an appropriate symposium on problematic fossils which, coincidentally, was organized by Matthew Nitecki, curator of fossil invertebrates at Field Museum. The wheel had turned almost full circle. More evidence is required to allow a full restoration of the conodont animal and confirm its biological position. We interpret the conodont elements as teeth—the comblike elements for grasping, the arched-blade elements for shearing or cutting, the platforms for grinding—but the details of food capture and processing need clarification and alternative functions cannot be ruled out. What we need are more specimens.

Study of the microscopic structure of the laminated limestones in which the conodont animal was found has revealed that they were formed as stromatolites, layers of sediment-trapping algae, probably in a highly saline intertidal environment. Although this has provided conditions suitable for the preservation of the soft parts of the animal, it is an unusual place to find conodonts. They normally occur in rocks of more open marine origin. A search of existing collections from the locality has failed to turn up any more specimens of the conodont animal. Dissolving the limestone in acid yields relatively few isolated conodont elements. Dick Aldridge has a grant from the British Natural Environment Research Council to investigate the conodonts from the Edinburgh locality further. His research includes collecting from what little outcrop remains in the original area and splitting layer by layer in search of more specimens. Up to this time none has come to light, and until one does, either in Edinburgh or elsewhere, many of our conclusions regarding the elusive conodont animal will remain unproven. **FM**



Thin-section of limestone from Granton, Edinburgh, which yielded the conodont animal. The rock was formed as a stromatolite; the dark bands are organic rich and represent layers of algae, which helped to bind the intervening layers of lime-rich mud. The light-colored 'speckles,' most frequent in a central band, were created by voids caused by trapped gas bubbles, which formed as some of the organic material decayed. About 5.7X. Photo by T. Easter.

AYER *continued from p. 10*

Wheelers, and Blairs. And gradually, the trips became the vehicle for collecting, collecting, collecting.

By 1893 the Columbian Exposition had come to Chicago. One of the features of the exposition was great collections—ethnology, natural history, minerals, gems—probably finer collections than had ever before been brought together for a fair. Included was Ayer's Indian collection. Ayer and others began to talk of securing the exhibited material for a new museum of natural history—an opportunity that would never again present itself and must not be allowed to pass. Ayer wrote:

> Of course Marshall Field was the richest man we had among us in those days, so during our fishing trips and on social occasions when I would meet Mr. Field, I began to talk to him (and others did, too) about giving a million dollars to start with. He always responded, 'I don't know anything about a museum and I don't care to know anything about a museum. I'm not going to give you a million dollars.'

Finally it was only a month until the fair's closing and the group decided to give up, raise what money and buy what they could, and distribute the material to the new University of Chicago, Northwestern University, the University of Illinois, and Beloit College. A friend wrote Ayer, asking if he would not see Marshall Field once more. To return to Ayer's words:

> I wrote back that I would do so, but that I did not believe it would do an atom of good.
>
> The next morning I was in Mr. Field's office when he arrived at about half past nine. I said:
>
> "Marshall Field, I want to see you tonight after dinner."
>
> "You can't do it," he replied, "I have a dinner party and shall be late."
>
> "Well, the next night."
>
> "No, I have another engagement then."
>
> "Well I have to see you right away; it is important."
>
> "You want to talk to me about that darned museum," was his reply to this.

Edward E. Ayer in his fifties. Photo courtesy the Newberry Library.

"Yes," I admitted.

"How much time do you want?"

I replied, "If I can't talk you out of a million dollars in fifteen minutes, I'm no good, nor you either."

He got up, closed the door, came back, and said, "Fire ahead."

I commenced in this way, "Marshall Field, how many men or women twenty-five years of age or younger know that A.T. Stewart ever lived?"

"Not one," he replied.

I continued, "Marshall Field, he was a greater merchant than you, or Claflin, or Wanamaker, because he originated and worked out the scheme that made you all rich; *and he is forgotten in twenty-five years.* Now, Marshall Field, you can sell dry goods until Hell freezes over; you can sell it on the ice until that melts; and in twenty-five years you will be just the figure A.T. Stewart is—absolutely forgotten. You have an opportunity here that has been vouchsafed to very few people on earth. From the point of view of natural history you have the privilege of being the educational host to the untold millions of people who will follow us in the Mississippi Valley.

I talked fast and steady. Finally, he took out his watch and said, "You have been here forty-five minutes—you get out of here."

I replied, "Marshall Field, you have been better to me than you ever have been before; you have always said No, and you haven't this time—yet. Now I want you to do me a personal favor: I want you to go through this World's Fair with me and let me show you the amount of material that is there—I mean exactly what there is that can be used in a natural history museum; for the collections can be gotten very cheap, much of the material for nothing. I want you to go through the World's Fair with me before you say No."

Mrs. Edward E. Ayer

"Well, Ed," he replied, "I should like to go through with you. George Pullman told me you had shown him through and that he had been astounded himself at the quantity of material that was there. My brother Joe is here and I should like to have you go with us. We will do it tomorrow morning at ten o'clock."

We went through the whole exhibition. When

we came out a little before one o'clock, I said, "Can Norman Ream and I come to your office tomorrow morning at half-past nine and see you about this matter?"

"Yes," he answered.

We were there promptly, and he gave the million dollars with which to start the Museum.

—a practice which continued for decades. The Ayer ornithological library at Field Museum is today one of the finest in the country.

In 1894 Mr. and Mrs. Ayer booked a trip to the Near East, travelling with the Lyman Gages, neighbors of the Ayers, and the Daniel Burnhams. A stop-

Ayer's Chicago home at the corner of State and Banks streets. The exterior was constructed of granite boulders from the fields where he had roamed as a boy. The photo was taken in 1918, but the house remains there today.

Ayer was elected the first president of Field Museum, beginning a devotion to the institution that continued until his death in 1927. He collected constantly in his travels. The first of more than 100 accessions of the Museum, secured by or as the gift of Ayer, was his Indian collection, one of the finest of that time. The next gift was his ornithological library, containing nearly all of the great volumes of colored bird plates. And joy of a librarian's joy, he ordered that anything necessary be bought and charged to him over in Cairo captivated Ayer and he promptly dropped out of the party to spend several weeks collecting in Egypt for the Museum.

March 26, 1894. Shepheards Hotel, Cairo. "Dear Skiff (the Director), I have purchased about 20 mummies, all the mummy shoes, 25 canopic jars, a lot of wooden and stone images ... and the best lot of Greek and Roman bronzes that I believe ever left Egypt."

The curator of the Anthropology Department, George A. Dorsey, did not welcome the material, or

Excavating the tomb chapel of Unis-ankh, one of two acquired for Field Museum by Ayer during his 1908 trip to Egypt. (See photo opposite.) 48660

Ayer, when they returned. He had no interest in building an Egyptian collection. But Ayer, as president, thought differently. On through the years he bought. He must have converted Dorsey.

> *February 9, 1908. The Egyptian Hotel, Cairo.* "Dear Mr. Skiff: Dorsey made connections here all right and is having the time of his life. We have bought about $2,500 worth and, of course, have got good things. This thing is drawing to a close fast and every year things get scarcer and higher, and it is very necessary that I have at least $3,000 more. I believe I can get a very fine tomb from the government now for about that money and in a very short time no money could buy one. I expect they will thoroughly excavate one we saw yesterday, while we are up the Nile, so we can see it all and I feel, and so, of course, does Dorsey, that it is imperative that we buy it. I wish you would please see the trustees personally, or a majority of them, and get permission and if they consent, that is, a majority of them, cable me here,... saying simply 'Yes.'"

The answer was "Yes" and today two fine tomb chapels are on exhibition in Field Museum. There is nothing like them in this country outside the Metropolitan Museum of Art and probably nowhere else in this hemisphere. Through all these years, Ayer did the buying of Egyptian material himself, by his own admission totally untrained. Yet it is a superb collection — one of the finest in the country. "He had a great eye. He knew what was good," commented Ruth Butler, the former curator of the collection of the Newberry Library.

In 1899 Ayer resigned as president of the Field

The tomb chapel of Unis-ankh as it may be seen today in Hall J.

Museum because of an unexplained "difference in policy with one of my fellow trustees." But the measure of the man comes through in his letter of resignation in which he stated, "I hope that you will not for one moment imagine that I have lost faith or interest in our beloved museum. Individuals and their actions are unimportant. The Museum is one of the very great ones of the world, and is here to stay.... I love the Museum from A to Z and always shall be as interested in its growth and as gratified at its prosperity as Mr. Field himself, and shall always do all I can to improve it and further its interests."

And he was true to his word. His loyalty and generosity to the Museum continued until his death.

Meanwhile, Ayer had continued to build his collection of source material on Indians and Western Americana. He became a trustee of the Newberry Library in the 1890s. In 1898 the Ayers were in Venice when the Spanish American War and news of the Battle of Manila broke out. He immediately wrote to his agents in Europe, South America, and North America, asking for lists of everything they had on the Philippines, whether printed or in manuscript. Within weeks after his return to Chicago he was possessor of the largest private collection of material on the Philippines in North America. He added through the years. Today the Ayer Philippine books and manuscripts are at the Newberry. The incredible thing about it is that Ayer was frank that he knew next to nothing about the Philippines until Dewey took Manila. But if it was important to the United States it was important enough for Edward E. Ayer.

Mr. Ayer later became a member of the U.S. Board of Indian Commissioners.

I had some fear, as I read and looked through letters and manuscripts of what I would find, because the board and other federal agencies dealing with native Americans have not earned themselves high regard in the minds of many, including most Indians. But my fears were unfounded. His sensitivity to the Indians and the moral questions of our treatment of them are clear and unequivocal. In 1892 he wrote, "Our government's treatment of its Indian wards have (sic) been almost as bad as any; treaty after treaty made only to be broken; scarcely an agreement left in 400 years; certainly very few in our day.... I served during the war of the rebellion in New Mexico and Arizona for three years. Every Indian was hostile from California to Mississippi; or nearly so, and we had a hard time of it. Of course, I came in contact with tribes of Indians that every man's hand had been against for over 300 years and they hated us. I don't think any one hated an Indian worse than I or

knew less of the subject. Since I have commenced to read about him, and put myself in his place, my views have changed very materially. We have simply destroyed a great race of human beings, in many of the virtues our superiors. . . ."

In 1915 he wrote to Mrs. Edwin Winter of New York City when sending her a report on the Menominee Reservation in Wisconsin, "An island has been described as a body of land surrounded by water. An Indian reservation has been described as a body of land owned and occupied by Indians and surrounded by thieves." To outwit the thieves he established a sawmill on the Menominee Reservation so that the Indians could profit from their own resource. It is hard for us today, familiar as we are with the cause of Indian rights, to realize what extraordinary sentiments these were in Ayer's time.

With all of his travels, Ayer was first and last a Chicagoan. He lived for years at State and Banks Streets, but early in his career he bought 12 acres of land on Lake Geneva's south shore. He had spent much time at the lake as a boy, swimming and fishing in it and hiking the surrounding forests. He later added about 1,000 acres. On the shore he built a cottage and in the woodlands a series of roads and paths. It was on Lake Geneva that he spent the happiest days of his life, with his family and friends and the accumulated memorabilia of a lifetime of travel.

The Ayers' closest friends seem to have been the Charles Hutchinsons—he was president of the Art Institute for 41 years, the Martin Ryersons — he served on the University of Chicago Board for 30 years, and the Daniel Burnhams. I've looked at the correspondence to and from these friends. The warmth and sentiment expressed in these letters is of a nature almost unknown today. And it extended beyond his immediate close circle. Stanley Field wrote, "You of all the men I know, have learned how to get the most out of life."

To Julius Rosenwald Ayer wrote, "If I had 10 sons and each of them had 10 sons my greatest wish would be that each of them would be like you." Rosenwald's response, "It makes life worth living to have bestowed upon one such cordial and whole souled friendship as I receive from you. If I merit one half of it, I shall feel like patting myself on the back." At one of Mr. Ayer's birthday celebrations Rosenwald appeared at the door, threw his arm around his friend and said, "Edward, I love you. I want to give you a birthday gift—$25,000 which I want you to spend for what you think best for the Field Museum." That fund still remains one of the Field Museum endowment funds.

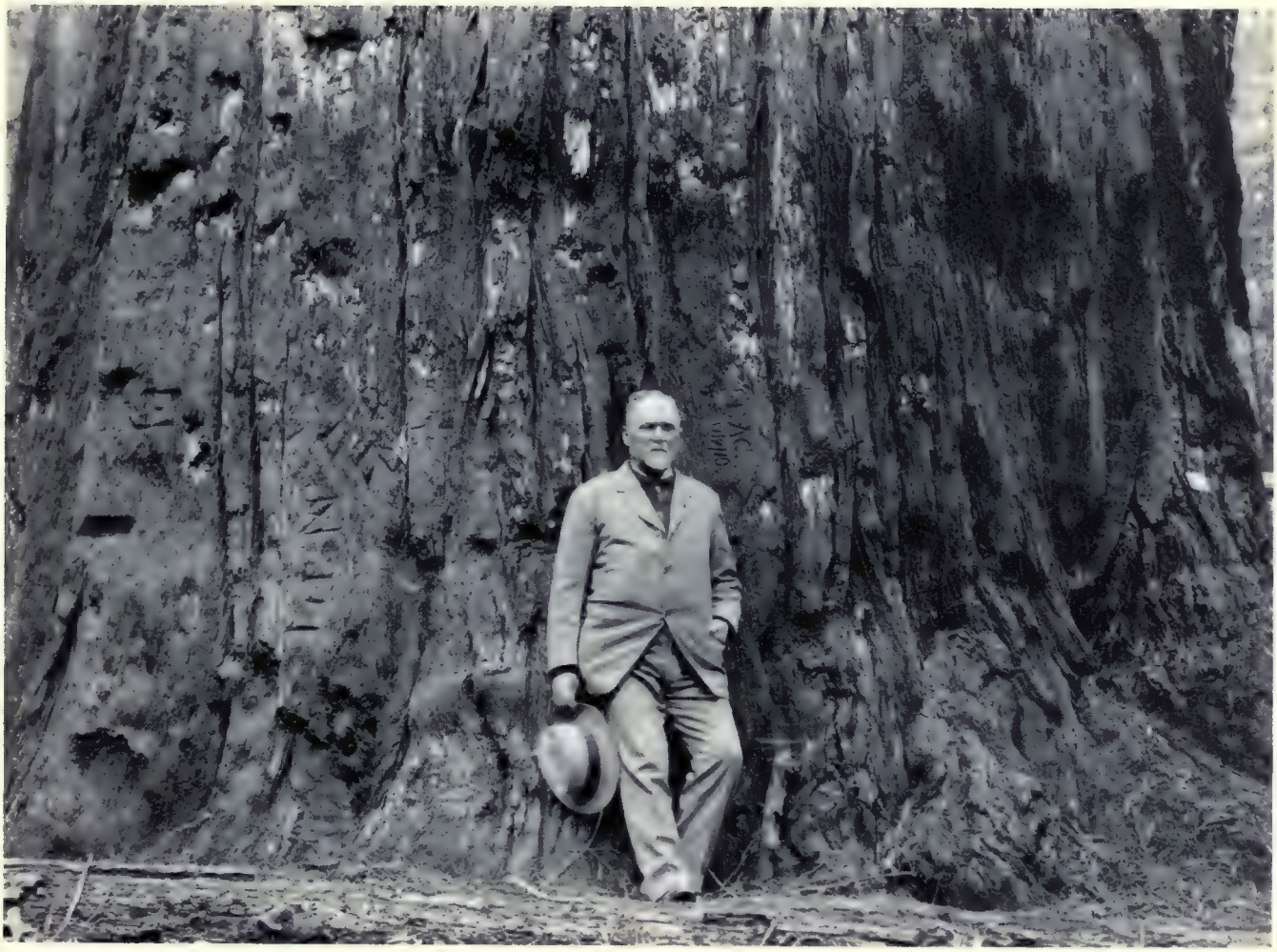
The record shows that Ayer in turn made major gifts to the University of Chicago in honor of Martin Ryerson, to the Art Institute in honor of Charles Hutchinson.

The character of Edward Ayer was best summed up in a fiftieth wedding anniversary note from Emma Ayer to her husband on September 7, 1915. One might hold a wife's writings suspect, but they reflect the writings of others that I read many times over. She wrote, "Each year lived with you has deepened my love and increased my respect and admiration for you. I have discovered in these years in you qualities of mind and heart I did not know you possessed when we set out to travel life's path together. In you I have found tenderness to those you love, loyal devotion to friends, strict uprightness in your business relations, a fine and correct artistic taste for all that is beautiful, courage and patience in bearing pain. . . ."

What do we make of a life such as Edward Everett Ayer's? What does it mean to us today, 57 years after his death? To put it into perspective, I think that we have to go back in time.

The city was smaller and concentrated. There was no green belt of corporate headquarters around Chicago. Luncheon at the Chicago Club concentrated the business and professional power of the city in one building. Living was less dispersed. Summer at Lake Geneva brought most of the well known names of the city together year after year. Travel by train and by ship was slow and companionable.

These people loved their city and its institutions. In April 1903 Mr. Ayer wrote Director Skiff from Venice about some Etruscan frescoes and other objects he had purchased: " . . . nothing of the kind ever found before and it makes them very fine for our dear museum. . . ." Now imagine anyone talking about a "dear museum" today! In 1911 he wrote Stanley Field from Algiers, "I have your somewhat discouraged letter of April 21. You certainly have had many trials in connection with our city. But you also have the love, confidence, and gratitude of all your associates in the grand work and of course the final outcome will be one of the great museums of the



An ardent conservationist, Edward Ayer was instrumental in saving large tracts of California redwood trees from destruction. Mrs. Ayer took this photo of her husband in 1919, when he was particularly active with the Save-the-Redwoods League. He is shown with the largest redwood tree in the Bull Creek Forest, Mendocino County, California. Photo courtesy the Newberry Library.

world and all of the untold millions that come after us will be provided with a chance to become conversant with the sciences. So you can readily see how much you are coming out ahead."

Three years later Martin Ryerson wrote Stanley Field from Rome that Ayer had left photos of some bronzes with him when Ayer left for Sicily and had asked Ryerson to follow through. Ryerson wrote "The bronzes look to me like important pieces which we should have in our collection. I think Mr. Ayer counts on being able to pay for them by subscription without burdening the budget of the Museum."

In Chicago, in Lake Geneva, in North Africa, and Rome, on the train to New York, their thoughts and their conversation was on the Field Museum, the Art Institute, the Newberry, and the University of Chicago. Their enthusiasm might today be thought a bit provincial or naive. Today, even families spend little time together, much less friends. If friends travel together the couples sit across the aisle from each other on a 747, not in deck chairs or Pullman cars. Our corporate offices are spread from Oakbrook to Waukegan and corporate leaders move from job to job and from city to city like members of the consular corps.

No exercise in nostalgia will bring back the past, but the past and those who lived it can teach us what it is that builds great and liveable cities—and what keeps them great. We have a Chicago today that needs thoughtful and considered dedication.

A look at the life of Edward Everett Ayer and his friends who built Chicago may give us pause and may move us to commit just a bit of our time and our treasure to Chicago. As Ayer wrote to Stanley Field in 1911, you can readily see how much we will come out ahead. FM

TOURS FOR MEMBERS

Peru's fabled "lost city" of Machu Picchu. Hermann C. Bowersox

Archaeological Tour of Peru And of La Paz, Bolivia

October 7 to 24
$3,195

Discover the cultural and natural diversity of Peru (and a little bit of Bolivia too), under the guidance of a Field Museum archaeologist/anthropologist who has lived and worked in that country. Tour participants will be drawn into the fascinating, seemingly alien world of the original inhabitants of the South American continent by walking among the ruins of their once-great cities. Our leader will help you experience much more than what is encountered by the conventional sightseer as you view the incredible wonders of ancient Cuzco, Colonial Lima, and the Inca ruins of Puruchuco. An overnight excursion to the famous "lost city" of Machu Picchu, as well as a visit to the Chinchero Sunday market will be a memorable weekend.

An added bonus will be our pioneering two-day stop at the recently discovered archaeological site in the Moquegua Valley in which Field Museum will play a major research role. We'll complete our tour with a visit to Bolivia, a hydrofoil ride across Lake Titicaca, and a visit to the city of La Paz. Here we'll tour the nearby ruins of the Tiahuanaco civilization. We invite you to join us and to get an insider's view of the past and present.

Our tour leader will be Dr. Robert A. Feldman, research archaeologist for the Field Museum Ancient Irrigation Project and currently director of "Programa Contisuyu." He has done field work in the U.S. and Peru. Before joining the Field Museum project, Dr. Feldman conducted excavations at a 4,000-year-old fishing village on the Peru coast, uncovering some of the earliest monumental architecture in South America.

Ancient Capitals Of China

September 22 to October 13
$3,550

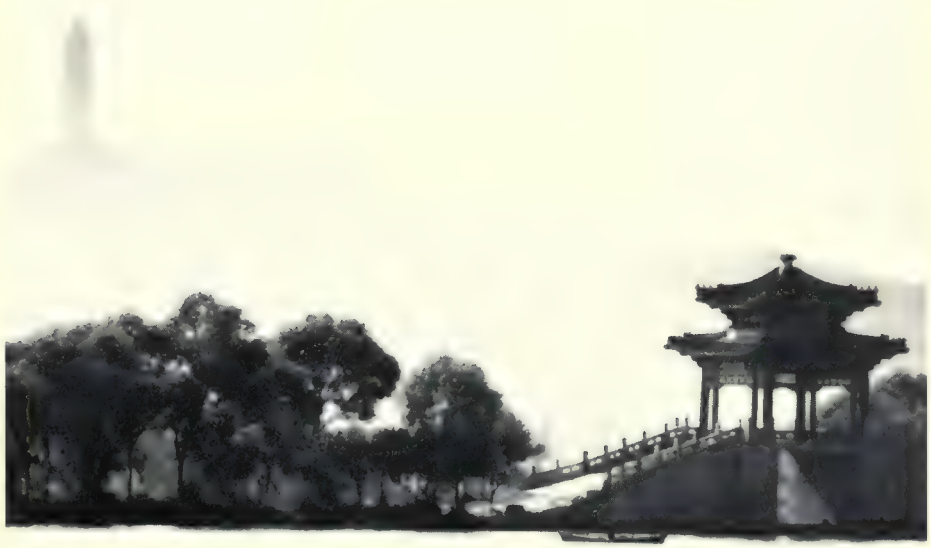
We are pleased to again offer our unique itinerary for China, with the addition of a two-day visit to Wuxi and Nanjing and a Grand Canal cruise from Wuxi to Suzhou. This program also

TOURS FOR MEMBERS

includes the most significant sites of early Imperial China and will provide an opportunity to explore in depth the civilization which characterized one of the oldest and longest-lived societies on earth.

Following our direct flight from Chicago to Tokyo, where we will spend the night, we will visit Beijing for three days, then to Xian for three days. Successive points in the itinerary then include Luoyang, Zhengzhou, Kaifeng, Nanjing, Wuxi, Suzhou, and Shanghai.

Mr. Phillip H. Woodruff, Ph.D. candidate in Chinese history at the University of Chicago, will be our guest lecturer. Mr. Woodruff has recently returned to Chicago after two years of research at Beijing University. His experience of living in China, his fluency in Chinese, and excellent rapport with the Chinese guides are a superb supplement to his leadership skills. This is the fifth China tour he has led for Field Museum.



China Tour, Sept. 22 to October 13.

Stanton R Cook, courtesy *Chicago Tribune*

Kenya

September 8 to 27
$3,595

You are invited to join us for an exciting 19-day safari to East Africa accompanied throughout by Audrey Faden, experienced lecturer and tour guide, plus local guides. Game is still plentiful and this tour is scheduled to coincide with the animal migration. It will be Spring in Kenya. The time to go is now! A trip to Kenya is a vacation that never ends. We hope you will make your reservation now.

Kenya Tour, September 8-27.

Start planning now for...

Tour of Egypt

February, 1985

If you wish to be placed on the mailing list for this perennially popular tour, or if you have questions about any of the other tours, please write or call Tours Manager Dorothy Roder, Field Museum, Roosevelt Rd. at Lake Shore Dr., Chicago, Il 60605. Phone: 322-8862.

0017195-00
Miss Marita Maxey
7411 N Greenview
Chicago, IL 60626

FIELD MUSEUM OF NATURAL HISTORY BULLETIN

September 1984

The Caribbean Connection

with

Clemente Steel Band, Rafo International Combo, and Take One Reggae Band

Saturday, September 29
1:00 to 4:00 pm

Field Museum of Natural History Bulletin

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CONTENTS

September 1984
Volume 55, Number 8

September Events at Field Museum 3

William Duncan Strong and the Rawson-MacMillan Subarctic Expedition of 1927-1928 5
by James W. VanStone
Curator of North American Archaeology and Ethnology

Field Briefs 11

Pill Millipedes from the Coal Age 12
by Joe Hannibal

What Museums Are Good For 17
by Rudolph H. Weingartner

Field Museum Tours 26

COVER

Scene in Warren Woods, Michigan. Photo by William Burger.

Events

The Caribbean Connection

with Clemente Steel Band, The Rafo International Combo, and Take One Reggae Band

Saturday, September 29
1:00-4:00pm
Stanley Field Hall

The cultural lure of African music has had a pervasive effect in America—from the founding of jazz and blues to laying the groundwork for rock and roll. There is a purity and durability in this music that proudly carries its heritage, paying homage to time-honored values. The Caribbean Connection is a celebration of West African musical traditions that have reemerged in the Caribbean Islands—Trinidad, Haiti, Jamaica, Cuba, Puerto Rico, and the Dominican Republic.

Listen to the pulsating rhythms of the Clemente Steel Band, a truly unique group that performs with instruments made from 55-gallon oil drums. Steel drum bands originated in Trinidad and are now common throughout the Caribbean.

Dance to the music of Haitian musician Rafael St. Vil and his group The Rafo International Combo. This group performs a variety of material including calypso, salsa, cumbias, compa (the traditional music of Haiti), and mambo. Rafo seeks out the connection between Brazilian salsa, American jazz, and Haitian compa.

Share the experience of "a people's music" with Chicago's Take One Reggae Band. Reggae music plays a central role in Jamaica's history, religion, and politics. It evolved from Caribbean calypso and ska music from the 60s.

These performances are offered in conjunction with Field Museum's special exhibit, *African Insights: Sources for Afro-American Art and Culture.* This exhibit presents over 70 pieces from the Museum's major African collection. These pieces help the viewer understand the influence of African culture as it moved through the slave trade into the Americas.

Paul Hansen

The Rafo International Combo, with The Caribbean Connection, September 29

African Insights is partially supported by the Illinois Humanities Council. This program is free with Museum admission, tickets are not required.

Family Feature September

Fall Foliage: A Pressing Matter
Saturday and Sunday, Sept. 15, 16
1:00 to 3:00pm
Plants of the World Hall, 2nd Floor

This program is free with Museum admission, tickets are not required. Illinois is home to a wide variety of trees and at no time are they more beautiful than in the fall. Examine leaves from many different kinds of local trees. Find out how to identify trees using their leaves. See how leaf samples from around the world are pressed by the botanists at Field Museum. Finally, press some leaves and make a leaf-identification notebook of your own.

CONTINUED >

Events

CONTINUED FROM PAGE 3

September Weekend Programs

Each Saturday and Sunday you are invited to explore the world of natural history at Field Museum. Free tours, demonstrations, and films related to ongoing exhibits at the Museum are designed for families and adults. Listed are only a few of the numerous activities available each weekend. Check the *Weekend Passport* upon arrival for the complete schedule and program locations. The programs are partially supported by a grant from the Illinois Arts Council.

September

1 12:00 noon. *Continents Adrift* (lecture/demonstration). Discover why fossils of similar dinosaur species have been found on continents separated by vast oceans.

2 1:00 pm. *Welcome to the Field* (tour). Enjoy a sampling of our most significant exhibits as you explore the scope of Field Museum.

8 1:00 pm. *Red Land/Black Land* (tour). Tour the Egyptian exhibit, focusing on the geography of the Nile Valley and the effect it had on Egypt.

1:30 pm. People of the Long House (slide lecture). Examine the Iroquois: the continuity of their culture, their relationships with Europeans, and their survival with both adaptability and grace.

9 *12:30 pm. Museum Safari* (tour). Seek out shrunken heads from the Amazon, mummies from ancient Egypt, and big game from Africa.

15 11:30 am. *Ancient Egypt* (tour). Investigate the traditions of ancient Egyptian civilization from everyday life to mummification and the promise of an afterlife.

16 1:00 pm. *The Brontosaurus Story* (tour). Look at some of the newest discoveries about the "thunder lizard" and other larger dinosaurs.

1:00 pm. *Welcome to the Field* (tour). Enjoy a sampling of our most significant exhibits as you explore the scope of Field Museum.

22 1:00 pm. *Ancient Egyptians* (tour). View ancient Egyptian artifacts from Predynastic times to Cleopatra.

23 12:30 pm. *Museum Safari* (tour). Seek out shrunken heads from the Amazon, mummies from ancient Egypt, and big game from Africa.

29 12:00 noon. *Treasures from the Totem Forest* (tour). An introduction to the Indians of British Columbia and southeastern Alaska, and the totem poles and masks so important to their cultures.

23 2:00 pm. *Traditional China* (tour). Examine the timeless imagery and superb craftsmanship represented by Chinese masterworks in our permanent collection.

These weekend programs are free with Museum admission and tickets are not required.

Edward E. Ayer Film Lectures

Travel the world on Thursdays in September at 1:30 p.m. in James Simpson Theatre. Admission is free. Doors open at 12:45 p.m. Members please bring membership card for priority seating privilege.

September 6	*"Bavaria—Magnificent World of the Mountain King,"* with Howard and Lucia Meyers
September 13	*"China,"* with Ray Green
September 20	*"Black Hills...Mystic Mountains of the Plains,"* with Allen King
September 27	*"Wales and the Lakes of England,"* with Ken Lawrence

William Duncan Strong and the Rawson-MacMillan Subarctic Expedition of 1927-1928

by James W. VanStone
Curator of
North American Archaeology and Ethnology

Fig. 1. *William Duncan Strong in 1928. Neg. 108960.*

Although Field Museum maintained an interest in the natural history of the arctic and subartic from its earliest years, it was not until 1926 that Museum staff members were actively involved in a northern expedition. In that year, Commander Donald Baxter MacMillan, a noted arctic explorer, proposed an expedition to Labrador and Greenland with scientific research as the sole purpose, and he approached Field Museum to secure a sponsor. Stanley Field, then president of the Museum, persuaded Frederick H. Rawson, a Chicago banker, to underwrite the expedition. As a result of Rawson's support, the Rawson-MacMillan Subarctic Expedition of 1926 sailed from Wiscasset, Maine on June 19 with stops along the coast of Labrador, the west coast of Greenland as far north as Disko Island, and Baffin Island before returning to Wiscasset 11 weeks later. Field Museum's representatives on the expedition were a bird taxidermist, an assistant curator of fishes, and a geologist from Cornell University who went along to collect geological specimens for the Museum (see the *Bulletin*, August 1982, pp. 4-11).

At the conclusion of the expedition, which was declared a success because of the large number of specimens obtained for the Museum's collections, Commander MacMillan persuaded the Museum and Frederick Rawson to sponsor a second expedition. This much more ambitious undertaking, beginning the following summer, was to last for 15 months. It was planned that a representative of each of the Museum's four scientific departments would accompany the expedition and it was for this purpose that William Duncan Strong, who had recently completed his graduate studies at the University of California, Berkeley, joined the staff of the Department of Anthropology as an assistant curator (fig. 1).

With the idea in mind that a winter camp for Field Museum scientists would be established on the coast of Labrador, the various scientific departments made plans for their participation in the Rawson-MacMillan Subarctic Expedition of 1927-1928. In a memorandum to Museum Director D.C. Davies, Berthold Laufer, Chief Curator in the Department of Anthropology, recommended two seasons of archaeological work at Eskimo sites on the coast and went on to present a plan for ethnological research:

> But in addition, special efforts would be made to study the nomadic Naskapi [Indians]. These people are almost unknown to science, and it is highly important that they be fully studied, as they still follow the old customs and live largely on the caribou herds that are very numerous in the interior of Labrador. During the summer friendly relations with

those coming to the coast to trade would be established, and a good interpreter and guide secured. In the autumn a trip would be taken into the interior in their company, living and hunting with some selected group. Thus it would be possible to obtain a good account of their mode of life, their social organization, shamanistic practices, folk-lore, language, and religious beliefs ... Whenever the opportunity offered, good specimens of their weapons, clothing and religious equipment would be secured, and in addition typical plant and animal species collected so that their culture and close relationship to their environment might be more vividly exhibited in the museum's collections.

To a very large degree, but not without overcoming considerable difficulties, Strong was able to carry out successfully the research proposals outlined by Laufer.

Commander MacMillan's schooner, the *Bow-*

Fig. 2. *Davis Inlet band and Barren Ground band Indians at Davis Inlet, 1928. Neg 79906 (Geology).*

doin, along with the schooner *Radio* and the power boat *Seeko,* left Wiscasset, Maine on June 25, 1927 reaching Hopedale on July 18 where Strong was able to undertake some brief archaeological investigations. From there the expedition proceeded to Nain, where a winter station was to be constructed about 20 miles northwest of that community (see map). All members of the expedition, including the scientific staff, were immediately put to work unloading supplies. Strong estimated that about three months of house-building, wood-cutting, and other labors would be necessary before the scientific work of the expedition could begin. But he was already concerned, as he wrote Laufer, about the problem of obtaining specimens:

> As for getting a collection I don't know where the funds will come from. MacMillan has some trade goods, but apparently no actual cash to pay for specimens. It is hard to get a representative collection unless one has direct control of funds to purchase it with —however, I trust that our trade goods will suffice, or that later Capt. MacMillan can let me have two or three hundred dollars in cash to purchase direct from the Indians. This winter I hope to get an interpreter and go in and stay with the Naskapi for several months but now all is manual labor and scientific work must wait.

Strong also looked forward to collecting a large amount of skeletal material from old Eskimo graves to augment the "scanty phys. anthrop. collections in the Museum." In the same letter to Laufer he shows signs of anxiety about the future success of his research, feelings with which all ethnographers will sympathize:

> I am well aside from a few bad boils caused by infected mosquito bites, and enjoy the hard work. All our supplies had to be landed from the ships in dories —including 29,000 feet of lumber, 40 tons of coal, a great bulk of food and house supplies, etc., but that is mostly finished at present and now we must build the big station; as there are only twelve of us to do all the work, no one is excepted and our other interests are in abeyance. Can't say I think much of Labrador either as a collecting field or as a senic [*sic*] location —the black flies, gnats and mosquitos are terrible, and the country unbelievably lifeless and desolate. I

only hope that the winter may yield material worthy of the effort, time and expense. At present I am not overly optimistic.

On August 7, without having completed the winter station, the *Bowdoin* left on a three-week cruise around Frobisher Bay on Baffin Island. During the course of the trip, Strong met a camp of Eskimos who were living in "quite primitive style" but he was frustrated in his attempts to obtain specimens by the absence of an interpreter and a lack of trade goods. In a letter to Stanley Field, he complained about the lack of trade goods and purchase funds, indicating that he had not yet discussed the matter with Commander MacMillan. "... as I really know nothing concerning what we have to trade and have no funds to purchase material I feel rather helpless, for without money one cannot get collections."

Although Strong collected some archaeological material on the Frobisher Bay trip, he considered these collections severely limited not only because of the paucity of sites, but because the *Bowdoin* moved frequently and there was no opportunity to work at any site for more than a day. Having experienced this frustration, it is no wonder that, in a letter to Field, he looked forward to winter when

> I hope to receive trade goods from Captain MacMillan and acquire a representative collection ... This winter's work seems entirely a gamble, but if I can acquire a good interpreter and dog driver combined, the chances for interesting material and data should be good.

On the basis of having met a few Naskapi at the winter station (fig. 2), he considered them "a rather surly and untrustworthy group so I anticipate several thrills this winter."

The *Bowdoin* returned to the site of the winter camp on August 29 and the next month was spent in constructing houses, cutting a winter's supply of firewood, and preparing the boats for wintering. As he contemplated a month of hard work unrelated to anthropology, Strong's initial pessimism returned. He wrote Field that

> I hate to seem entirely pessimistic but must admit that there is not much of promise in sight as regards either the acquisition of anthropological collections or scientific data. The country is unbelievably desolute, the Labrador Eskimo thoroughly civilized and the Naskapi culturally poverty striken.

The ethnographer was looking forward impatiently to the time when freeze-up would make interior travel possible and he would have an opportunity to meet Indians.

Strong was also extremely dissatisfied with his archaeological accomplishments so far and, in the letter to Field just quoted, attributed his lack of success to being tied to a permanent base and preordained cruise where "most of the time is spent cruising in barren places instead of working steadily in the productive regions." In any event, his concern about having funds to purchase specimens must have been relieved when, in early September, he received a letter from Laufer informing him that Commander MacMillan had set aside $1,000 for the purchase of specimens. It is not clear why the obvious misunderstanding with regard to trade goods and purchase funds was allowed to continue as long as it did. Certainly it would seem that Strong could have settled the matter by simply making direct inquiries of MacMillan.

On September 29 Strong left on a trip south to Big Bay and up Hunt River in the hope of locating a band of Naskapi reported to be in that area. On this trip he had with him an eighteen-year-old interpreter who, as it turned out, had never been in the area before and could not locate the Indians. The trip of nearly 100 miles was made by canoe and although the main purpose was not achieved, old camps were visited and photographed and the ethnographer learned a great deal about interior travel. Before returning to the winter station on October 15, the travelers encountered severe snowstorms and ice in the lakes. Strong felt that he had returned to the coast just in time. This experience convinced him that the Indians might be difficult to locate since they were always on the move following the irregularly migrating caribou. Winter clearly would be the best time to intercept the Naskapi since rapid travel by dog team in the interior would be possible.

It was apparently at this time that Strong learned about Joe Rich (Shushebish) with whom he was to live during his stay with the Davis Inlet band and who was to be his chief informant (fig. 3). Although he did not meet Rich until later, he began to make definite plans for work after freeze-up. It was probably this activity rather than any definite accomplishments that encouraged the ethnographer and brightened his frame of mind when he wrote Laufer that "on the whole I feel that prospects for valuable work, both as regards specimens and acquisition of scientific data, are much improved." During his travels along the coast on the way to the Hunt River, Strong reported a number of interesting archaeological sites and also made a collection of Eskimo skeletal

material. He planned further investigations and excavations for the following summer.

From mid-October until early January, 1928 was, for the most part, a period of inactivity for Strong and other members of the expedition. Since ice was forming, travel was virtually impossible and most of the time was spent working on the houses at the winter station and performing other chores. Between December 11 and 14, however, Strong, accompanied by one man and a dog team, was able to visit a Naskapi camp about 15 miles northwest of the winter station. Some photographs and specimens were obtained but the visit was prematurely terminated when the Indians decided to move their camp to a new site near the station. From December 15 to mid-January Strong had some contact with these Indians at their new camp, but since there was no interpreter he was not able to accomplish a great deal. The Indians were apparently members of the Davis Inlet band but Joe Rich was not among them.

On Tuesday, January 17, 1928 Strong left for the interior with members of the Davis Inlet band, having arranged room and board with Joe Rich for $1.00 per day. On that day he exclaimed enthusiastically, "My work has begun!" Among his companions were men who were to become his best informants, including Edward (Mistanapish), and Tommy (Shinabest). Crowded in a small tent with as many as ten Indians, eating what they ate, helping haul toboggans and hunting with the men, Strong's introduction to field ethnography was an arduous one. His diaries clearly show the periods of encouragement and discouragement, depression and exhilaration, certain to occur under such circumstances, which are familiar to

Fig. 3. *Joe Rich (Shushebish), Strong's chief informant. Neg. 61680.*

Fig. 4. *Edward Rich demonstrating use of the single-headed drum as Strong and Shinabest observe. Neg 61538.*

ethnographers who have worked in the arctic and subarctic in winter.

After approximately one month with the Davis Inlet band, Strong, Joe Rich, and other Indians made a brief trip to Davis Inlet for supplies. He was thus able to send a radiogram to Davies:

> Just back from month with Indians living in country good specimens photographs and considerable information secured. They are living in tents and eating caribou and trout in old Indian style making snowshoes, tanning skins etc. ... Will probably live with them all through spring and early summer. If I am able to stay with them for a long period my studies should be unique and valuable (fig. 4).

Strong went on to note that since game was scarce during the winter, the Indians were more willing than usual to have a white man join the band. He apparently brought with him some food as well as cash and trade goods with which to pay for specimens and information. After resting up at the winter station for about a week working with his interpreter, he returned to the camp of the Davis Inlet band which, at that time, was located about 120 miles southwest of the winter station.

Strong's sojourn with the band ended sooner than he had anticipated. Because of the scarcity of caribou, the Indians returned to the coast and the vicinity of the trading post April 5. Nevertheless, the ethnographer had spent nearly three months with the band collecting more than 500 ethnographic specimens and taking a large number of photographs.

The months of April, May, and most of June were devoted to collecting anthropometric data from Eskimos at Hopedale, Nain, Okak, and Hebron. With the return of navigation in late June, archaeological surveys and excavations were undertaken on Hunt River, Big Bay, at Hopedale, and on the islands east of Nain. The expedition left the Labrador coast on August 23 and arrived at Wiscasset on September 8, 1928 after an absence of almost exactly 15 months.

Although Strong frequently found it difficult and frustrating to work within an expedition framework, and although MacMillan was apparently somewhat authoritarian at times, both were eventually pleased with the anthropological results of the second Rawson-MacMillan Subarctic Expedition. Strong expressed his satisfications, as well as his frustrations, in his diaries, field notes, and letters to Museum personnel. MacMillan's opinions were offered in a letter to Stanley Field which constituted a final report on the expedition:

> The principal reason for locating our headquarters... no farther north than Nain was to establish and maintain constant communication with the little known Nascopie Indian tribe. In this we were eminently successful and Dr. Strong's report and ethnological collection will speak for themselves. I feel that the Expedition has brought back more than all other expeditions or anthropologists combined; that is, something really authentic and of real value.

In August, 1929 William Duncan Strong resigned his curatorial position and for the next three years taught at the University of Nebraska, where he developed a life-long interest in Plains archaeology. In 1931 he became senior anthropologist at the Bureau of American Ethnology, Smithsonian Institution. He moved to Columbia University in 1937, where he remained until his death in 1962. FM

FIELD BRIEFS

Women's Board Presidents, Past and Present. *Shown at the May 9 Women's Board Annual Meeting are (l. to r.) Mrs. O. Macrae Patterson (president 1974-76), Mrs. Joseph E. Rich (1976-78), Mrs. Philip D. Block III (newly-elected president), Mrs. T. Stanton Armour (1982-84), and Mrs. Edward F. Swift (1978-80). Not shown are Mrs. Edward Byron Smith (1970-72), Mrs. B. Edward Bensinger (1972-74), and Mrs. Robert Wells Carton (1980-82). The Women's Board was founded by the late Mrs. Hermon Dunlap Smith, who served as first president, 1966 to 1970.*

New Women's Board Officers

The new president of Field Museum's Women's Board is Mrs. Philip D. Block III, elected at the board's annual meeting, May 9. Mrs. Block succeeds Mrs. T. Stanton Armour, elected in 1982. Other new officers elected at the meeting were Mrs. Charles S. Potter, vice president; Mrs. Howard J. Trienens, vice president; Mrs. Edward Hines, recording secretary; Mrs. James J. Glasser, corresponding secretary; Mrs. John H. Leslie, board member-at-large; and Mrs. E. Norman Staub, board member-at-large.

Continuing in their respective offices are Mrs. James J. O'Connor, vice president; Mrs. William D. Frost, treasurer; and Mrs. Frederick G. Jaicks, board member-at-large.

Peter Crane Honored

Peter R. Crane, assistant curator in the Department of Geology, was recently awarded the Bicentenary Medal of the Linnean Society of London. The Linnean Society is the premier society for professional biologists in the United Kingdom and makes the award annually in recognition of scientific work done by a biologist under the age of 40. The silver medal was first struck in 1978 in commemoration of the 200th anniversary of the death of Carolus Linnaeus, the eighteenth-century naturalist who first proposed the system of naming plants and animals that is still in use today.

Crane, 30, joined the Field Museum staff in September of 1982 after a year of research at Indiana University and three years on the faculty of the University of Reading, England. His research is currently supported by the National Science Foundation and involves paleobotanical studies of fossil flowering plants from southern England and North America. Crane is a member of the Committee on Evolutionary Biology at the University of Chicago and is coeditor of the paleontological journal *Paleobiology.*

Diane Alexander White

Reverse side of Bicentenary Medal of the Linnean Society of London, awarded to Peter Crane.

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For further information on the importance of having a will, send for the complimentary booklet offered below.

---------- CLIP AND MAIL ---------

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Planned Giving Officer
Field Museum of Natural History
Roosevelt Road at Lakeshore Drive
Chicago, IL 60605

( ) Please send my free copy of "How to Protect Your Rights with a Will.

Name _____

Address _____

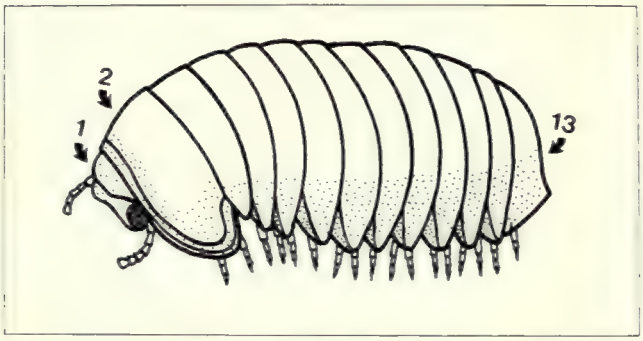
City _____ State _____ Zip _____

Phone: (Bus.) _____ (Res.) _____

Best time to call (day) _____ (hour) _____

PILL MILLIPEDES From The Coal Age

by Joe Hannibal



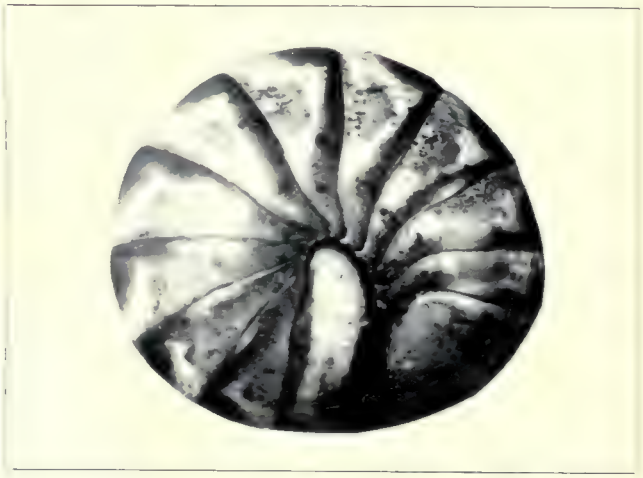
One of the larger modern pill millipedes, Sphaerotherium, *from Africa. The small first tergum, the large second tergum, and the thirteenth tergum, a rounded terminal plate, are labeled 1, 2, and 13. (Modified from R. F. Lawrence. 1953. The Biology of the Cryptic Fauna of Forests, fig. 26A.)*

During much of the Carboniferous Period (360-285 million years ago), lush tropical forests and swamplands covered a large part of what is now temperate North America and Europe. Extraordinarily well-preserved fossils from the Mazon Creek area, an hour's drive south of Chicago, provide us with a glimpse of the animal life which inhabited these regions at that time.

A host of different animals, some familiar to us, some very strange, are preserved in concretions (sometimes called ironstone nodules) found in rock outcrops along Mazon Creek and in the nearby spoil piles of strip mines. This fauna is justifiably world famous, and several of the terrestrial animals in the Mazon Creek fauna are the earliest, or among the earliest, of these types in the entire fossil record.

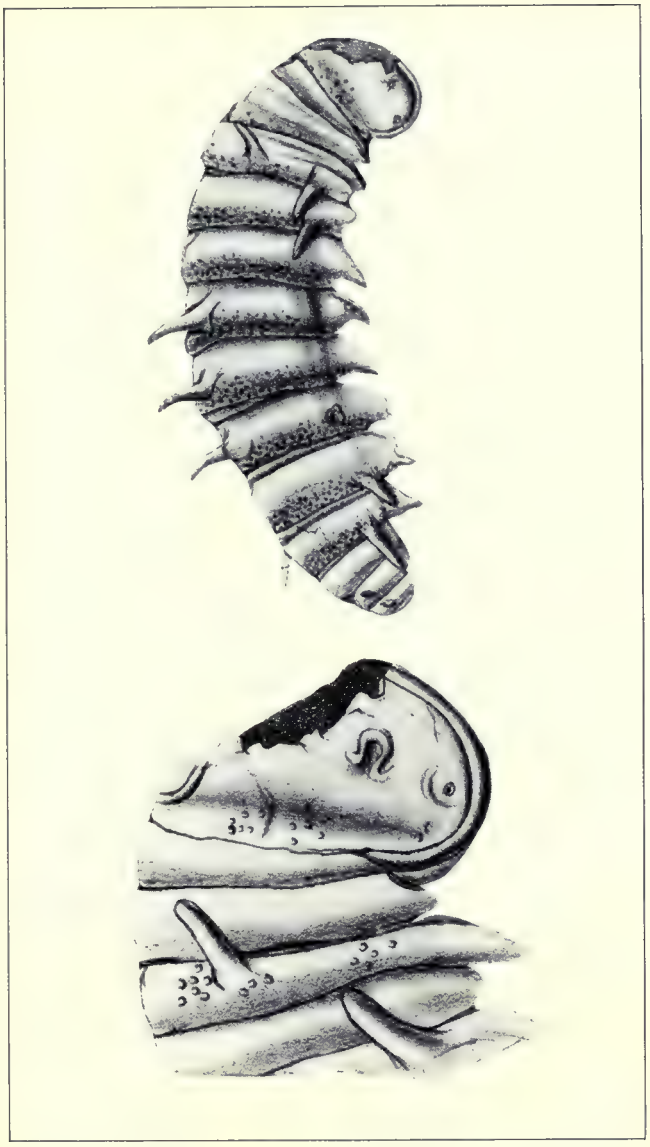
Among the more fascinating of these animals is the pill millipede, so-named for its remarkable ability to curl into a tight ball when threatened. Pill millipedes (also known as oniscomorphs) share this talent with a variety of other animals, including the pillbug, and the armadillo, a mammal. Though they bear some similarities, the pill millipede and the pillbug belong to separate classes (Diplopoda and Crustacea, respectively), and can most readily be distinguished from one another by the number of legs — pillbugs have only seven pair, pill millipedes many more.

In addition to Mazon Creek, only a handful of Coal Age sites in North America and Europe have yielded fossil pill millipedes. Outside of these early occurrences (except for a possible pill millipede reported from the Cretaceous—135 to 65 million years



Pill millipedes are so named because of their ability to coil into a tight sphere. The head and small first tergum are tucked inside, while the rest of the terga interlock. This is a photo (side view) of Arthrosphaera, *a modern pill millipede of moderate size from Sri Lanka.*

Joe Hannibal is associate curator of invertebrate paleontology for the Cleveland Museum of Natural History.



One of the specimens of Amynilyspes *from Bohemia as illustrated by Anton Fritsch in his* Fauna der Gaskohle und der Kalksteine der Permformation Böhmens. *Above is the entire specimen. Below is a more detailed look at the front of the fossil, including what Fritsch interpreted as a "head," complete with an "eye." (The original specimen is in the National Museum, Prague.)*

ago) they are not again encountered as fossils until the Oligocene, in the 30 million-year-old Baltic amber deposits.

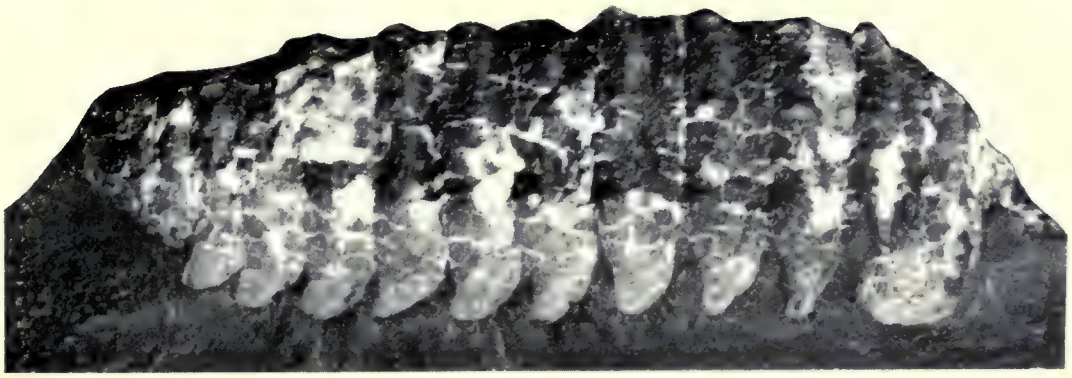
Today the pill millipede occurs almost worldwide, though it is no longer found in Illinois. The Coal Age forms differ from their modern counterparts, but not as much as some scientists formerly believed. In order to interpret the fossil evidence for these animals, we must first look at the living forms.

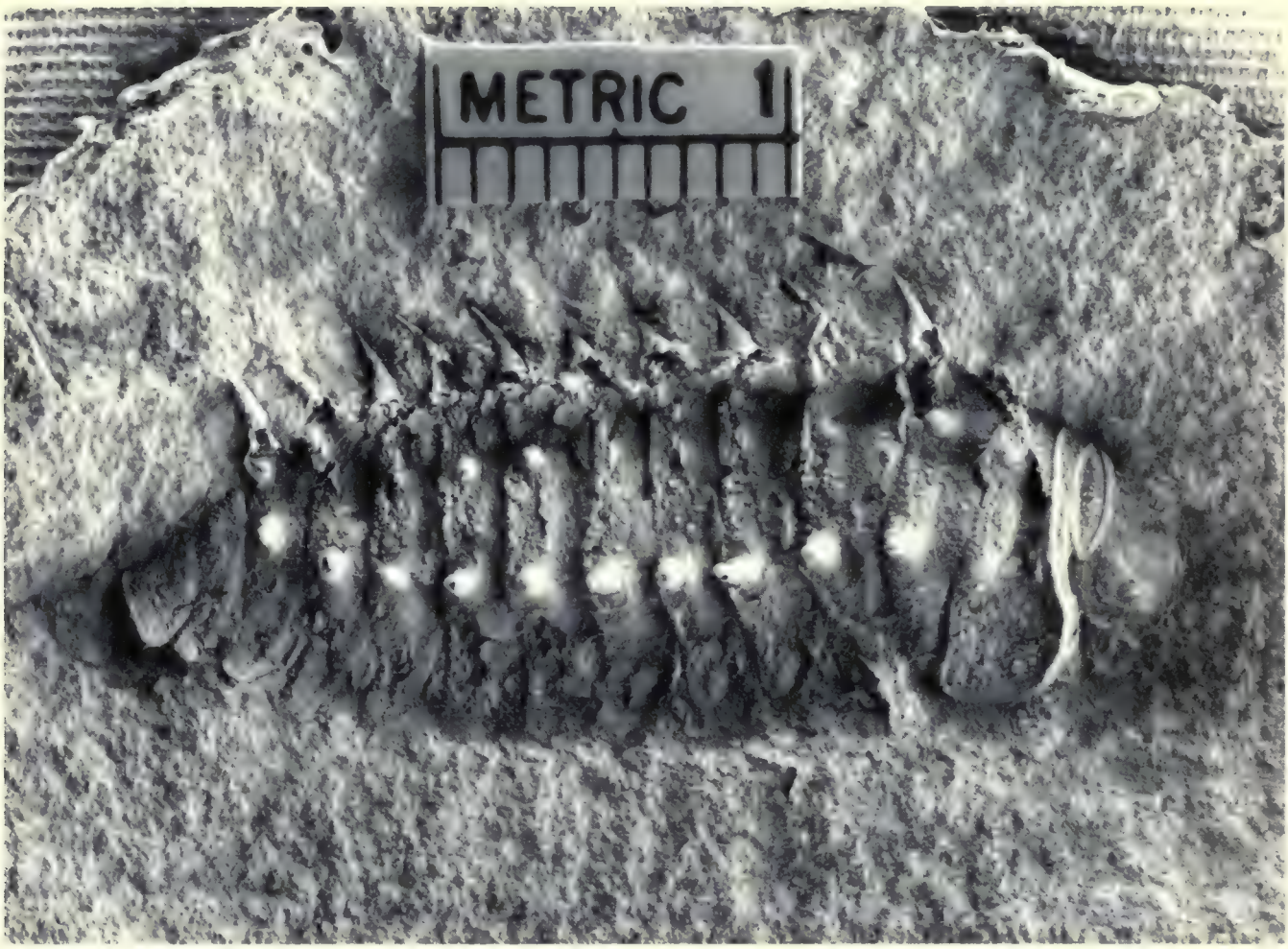
Modern pill millipedes belong to two major groups, the glomerids and the sphaerotheriids. Generally smaller than the sphaerotheriids, the glomerids have 11 or 12 dorsal body plates known as terga. The first tergum is small, the second very large, and the last is prominent and rounded. Usually less than an inch long, glomerids are common in parts of Europe and Asia, and they occur as well in Mexico, California, North Carolina, and in adjacent Eastern states.

The body plan of sphaerotheriids is generally similar to that of glomerids, but the former are distinguished by having 13 terga. Some sphaerotheriid species, known as giant pills, when coiled are the size of a golf ball. Largely tropical to subtropical in distribution, this group is found in Asia, Australia, southern Africa, and on islands near these continents.

The first Coal Age pill millipede to be described was discovered over a century ago in a concretion from Mazon Creek. Samuel Scudder (1837-1911), an American scientist best known for his work on butterflies, described this millipede in 1882, ascribing

Amynilyspes, *a spinous pill millipede from Mazon Creek. This specimen is about an inch long; the head area is at the right. This photo of a three-dimensional specimen was taken by the late Eugene Richardson, former curator of invertebrate fossils at the Field Museum. (Field Museum Invertebrate Paleontology Collections, PE 13947.)*





Another specimen of Amynilyspes *from Mazon Creek. This specimen is a bit more than an inch long. Though the fossil is flattened, most of the spines and body segmentation of the animal are visible. The small first tergum of the millipede is at the right. This photo is of a latex cast made of a Field Museum specimen. Photo by Bruce Frumker, Cleveland Museum of Natural History. (Field Museum Invertebrate Paleontology Collections, PE 12802.)*

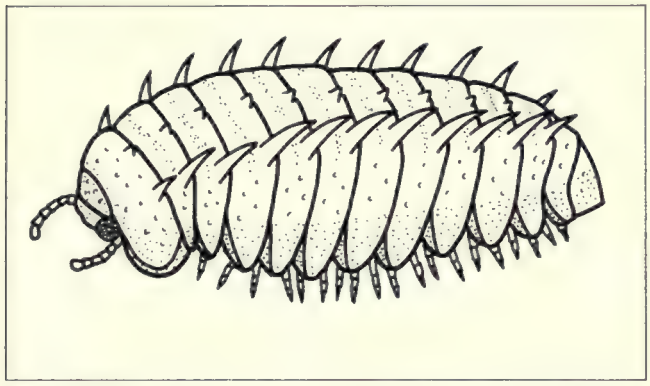
to it 10 or 11 segments, then believed to represent the anterior, or front part, of the animal. The name Scudder chose for it was *Amynilyspes wortheni, Amynilyspes* being loosely translated as "spiny creeper," and *wortheni,* the species name, honoring a nineteenth-century paleontologist, Amos Worthen. Scudder later wrote that the animal was rather broad and had spines, features that seemed to separate it from modern pill millipedes; he therefore did not classify it with pill millipedes (the oniscomorphs), but with another group. Scudder noted, however, that *Amynilyspes* might eventually prove to be a pill millipede, a prediction which later proved accurate.

Anton Fritsch (1832-1913), a prominent European zoologist and paleontologist, described two additional species of *Amynilyspes* at the turn of the century. Fritsch's specimens were from the Gaskohle, of Nyrany, Bohemia, now in Czechoslovakia. Basing his classification on the study of more complete specimens, Fritsch assigned *Amynilyspes* to the oniscomorphs. Fritsch also described several types of nonspinous fossil pill millipedes, placing these in two new genera, *Archiscudderia* and *Glomeropsis.* The first he named for Scudder, the second for the modern pill millipede *Glomeris.*

Fritsch made great strides in the interpretation of fossil pill millipedes, describing features such as pleura (rectangular ventral plates) that clearly revealed their affinity with modern forms. But some of Fritsch's interpretations were incorrect. He found for instance, that *Amynilyspes* had a very large "head," complete with an "eye," even though such a large head could never have been tucked under when the animal coiled, as modern pill millipedes are able to do. So until quite recently, *Amynilyspes* had generally been thought to lack the ability to completely roll up when threatened.

It has now been shown that Fritsch's "head" is

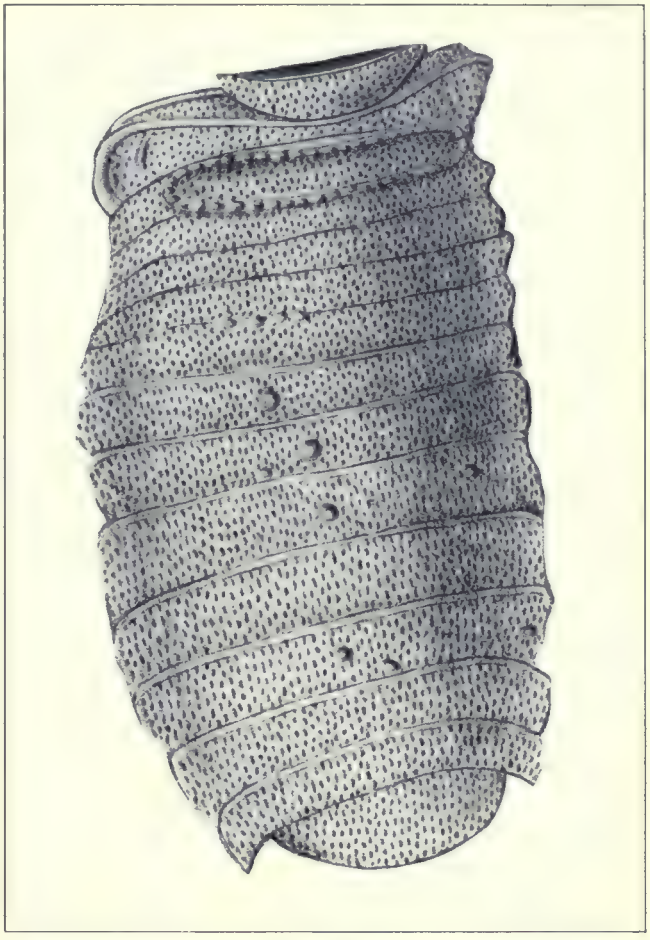
not the actual head of the fossil, but the millipede's large second tergum, a segment which, furthermore, bears no eye.



Modern reconstruction of the spiny Amynilyspes, *primarily based upon specimens from Mazon Creek.*

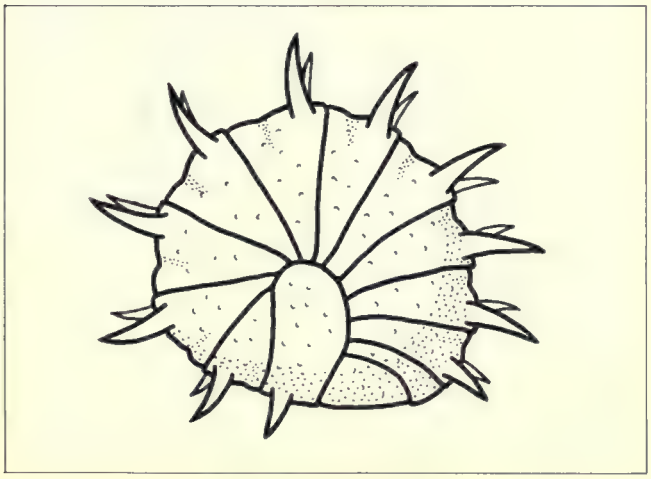
We know by examining the shape and structure of their body parts that *Amynilyspes* and other pill millipedes had the ability to coil. A Mazon Creek specimen bears segments which, as in modern forms, are shaped in a way that would permit coiling. Another Mazon Creek specimen shows the small first segment of the millipede clearly. Occasional specimens from Mazon Creek also show parts of the ventral surface of the millipede, including pleura.

Fritsch overestimated the number of segments on some of the fossil pill millipedes from the Gaskohle. He found some, including *Amynilyspes,* to have 15 terga, although most specimens of fossil pill millipedes from the Gaskohle — and from other



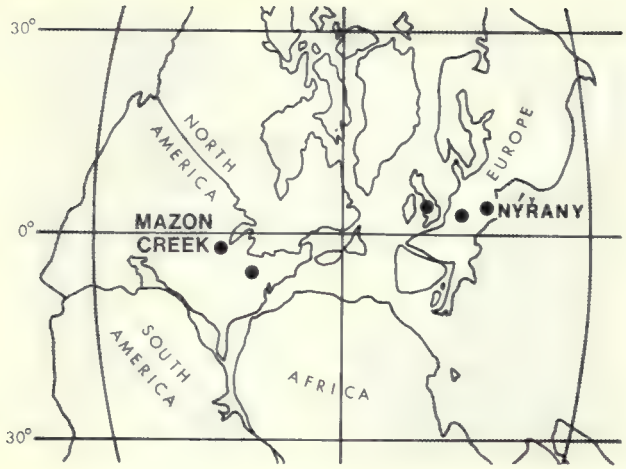
One of Fritsch's illustrations of the nonspinous fossil pill millipede, Archiscudderia. *This specimen is incorrectly shown with 15 terga, though it actually has 14, as do most Carboniferous pill millipedes. (The original specimen is in the National Museum, Prague.)*

Hypothetical view of a completely coiled Amynilyspes. *This reconstruction is based upon study of the morphology of the millipede, which indicates that it could coil.*



Carboniferous Age rocks — actually have 14. Some Mazon Creek fossils of nonspiny pill millipedes seem to have 13; but being incompletely preserved, the actual number cannot be established with certainty. These, too, might have had 14 terga.

Since the pioneering work of Scudder and Fritsch, a few investigators have reported additional well-preserved specimens of fossil pill millipedes from the same general period. Dietrich von Schlechtendal, in a 1912 study of Coal Age arthropods, illustrated two specimens of fossil pill millipedes, which he assigned to the genus *Paraglomeris.* B.N. Peach, a British paleontologist, reported a fairly well preserved pill millipede from Great Britain in 1914, naming this nonspinous specimen *Palaeosphaeridium.* A specimen of *Amynilyspes* was reported from Germany's Saar region by paleontologist Reinhard Förster in the 1970s. In 1981 Rodney Feldmann, of Kent



Placement of the continents during the Upper Carboniferous. Outlines show approximate boundaries at that time of present-day continents. The stippled area represents seas; the white areas represent land masses. Labeled localities at which fossil pill millipedes have been found (Mazon Creek, Illinois; Nyrany, Czechoslovakia) are indicated by black dots. The unlabeled dots represent localities in Ohio, Great Britain, and Germany. (Modified from Scotese et al., *1979, Paleozoic base maps.* J. Geol., *figs. 32-33.)*

State University, and I redescribed Scudder's original specimen of *Amynilyspes* as well as described new specimens from Mazon Creek.

More recently, John Almond, a doctoral candidate at the University of Cambridge, England, has located both spinous and nonspinous varieties of fossil pill millipedes in British museum collections. And last year David Hamilla of Youngstown, Ohio, discovered fossil pill millipedes in that state.

According to modern reconstructions of the continents during the Carboniferous, all of the abovementioned localities from which fossil pill millipedes have been reported belonged to the same land mass during that period. These localities were also tropical, within 10 degrees or so of the equator.

Roaming these same equatorial forests and swamplands were a host of predators: giant scorpions, primitive spiders, and a good number of amphibians (one of the chief predators of millipedes today).

Coiling seems to have been the first line of defense for pill millipedes against their predators, a defense tactic that is still remarkably effective. Some pill millipedes, the glomerids, have another defense mechanism—an offensive fluid exuded from pores on certain segments. There is no evidence of such pores on any of the fossil pill millipedes, though these structures could well have been present.

Amynilyspes had an important additional means of defense—its large, stout spines. These spines have no counterpart in modern pill millipedes, though some living species do bear tubercles, ridges, or very small spines on their terga. Since many modern forms of pill millipedes burrow in leaf litter and soil, spines of any size would greatly interfere with such activity. Perhaps the spiny *Amynilyspes* lived in more open habitats than most of its modern relatives. It may have found the spines useful in situations where it could not coil, as when crawling on plants.

It is only by careful study of additional well-preserved specimens, such as those from Mazon Creek, that we can begin to better understand the nature of prehistoric animals such as *Amynilyspes* and other fossil pill millipedes. Only then can we begin to unravel the relationships of the fossil forms with the modern fauna. **FM**

A nonspinous pill millipede from Mazon Creek, preserved with fronds of Pecopteris, *a Coal Age fern. This specimen from the Field Museum collection has been regarded as a possible sphaerotheriid because it seems to have 13 terga. The fossil millipede is about ½ inch long. (Field Museum Invertebrate Paleontology Collections, PE 29386.)*

What Museums Are Good For

by Rudolph H. Weingartner

A Boy Scout troop can meet conveniently under the sponsorship of the town's historical museum; the lecture hall of its art museum might readily house a stimulating course on Hindu thought. But is that what museums are for? One can poke holes into the soil passably well with a Phillips screwdriver and thus plant seeds at the right depth; that tool will also do if one lacks an icepick. It is fairly difficult, though, to find a substitute when a Phillips screwdriver is needed to do what only it can do. Many implements can be put to numerous uses, but most have characteristics that make them especially capable of performing functions that are distinctively theirs. That distinctiveness confers a special value on an object.

Museums are vastly more complex than manufactured tools. Still, a look at the characteristics and functions that are peculiarly theirs will yield a better understanding of what museums are good for.

What do museums in fact have in common, considering the immense differences among the great palaces that are devoted to works of art, the modest rooms occasionally set aside for displays of the history of brewing or printing, rooms that exhibit skeletons of prehistoric animals and rooms that display regional costumes of 19th-century Croatia? All such museums house *objects*, collections of real things, pertaining to some given domain or theme. Principles of coherence of collections may be numerous and tenuous; but it always matters to museums that their holdings are as

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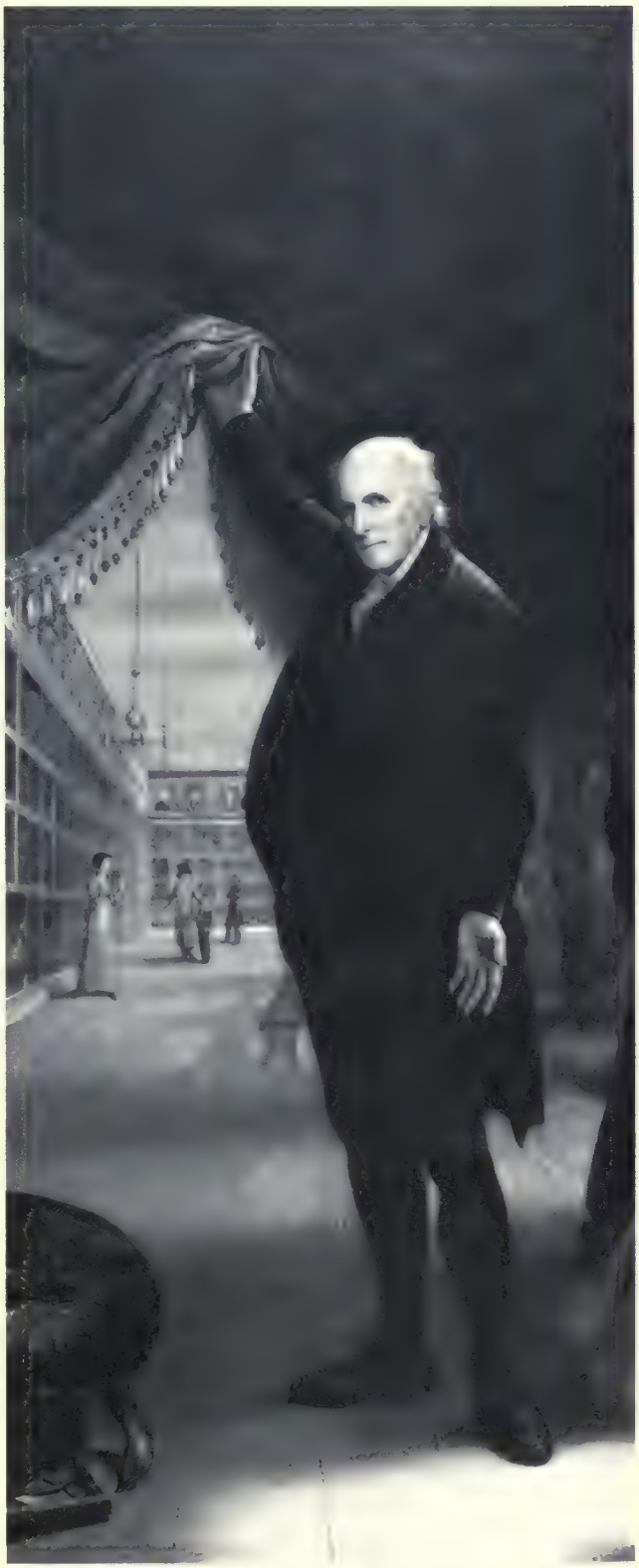
Editorial conventions followed in this article are those of the original, as it appeared in Museum News, *and do not necessarily reflect those of the Bulletin.*—Ed.

Rudolph H. Weingartner is dean of the College of Arts and Sciences and professor of philosophy at Northwestern University.



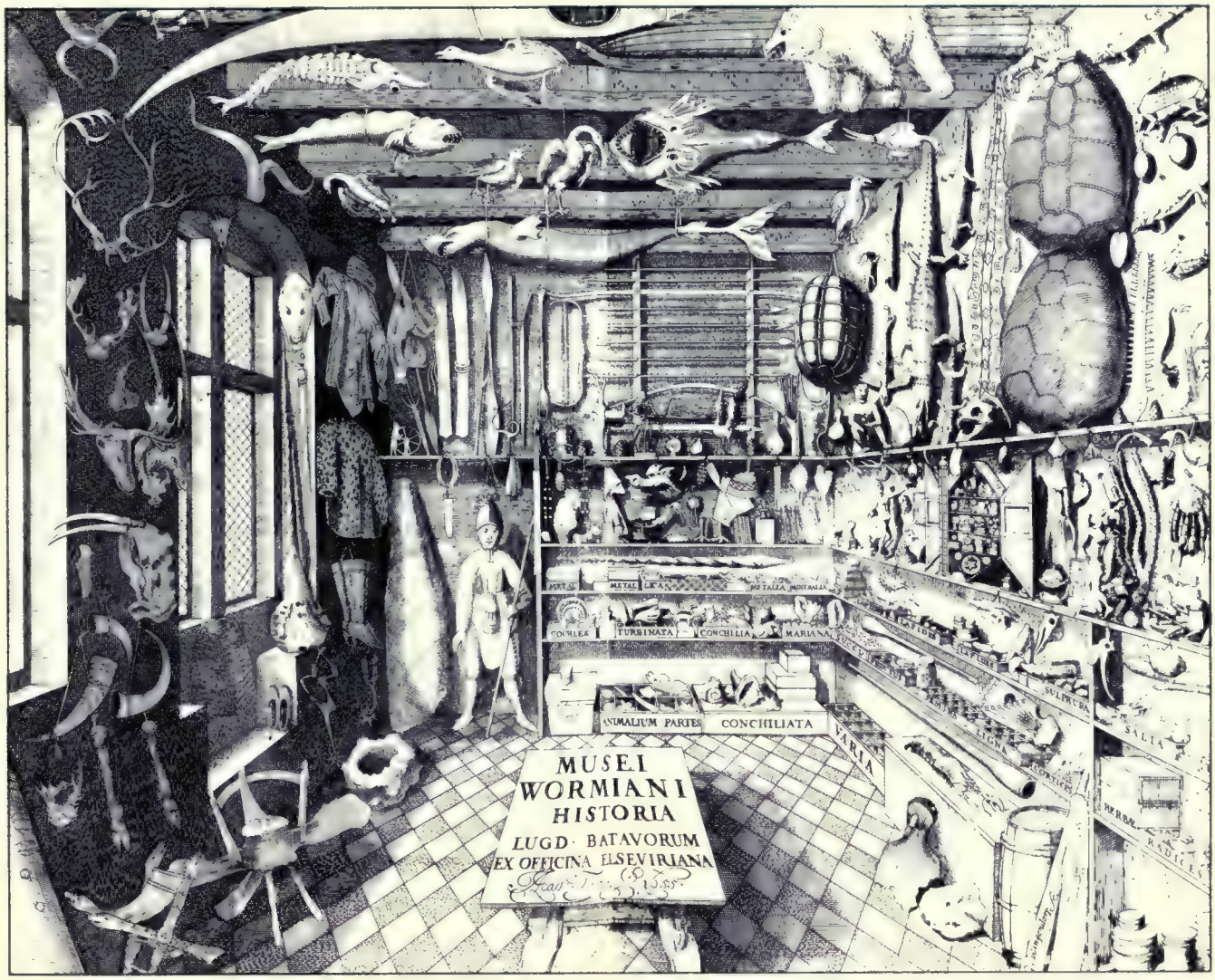
"The Artist in His Museum" (detail), self-portrait by Charles Willson Peale (1741-1827). As well as being one of the nation's great early portraitists, Peale distinguished himself by establishing the first important public museum in the United States, opening it in Philadelphia in 1786. First named for himself, the museum was later renamed the Philadelphia Museum. "The Artist in His Museum" is in the Joseph and Sarah Harrison Collection of the Pennsylvania Academy of Fine Arts, Philadelphia

Three Early Fathers of the Modern Museum. *Swiss physician Philippus Paracelsus (1493-1541),* **above left;** *German mineralogist Georgius Agricola (1494-1555),* **above right;** *and Elector Augustus I of Saxony (1526-86),* **below,** *were collectors of natural history specimens who sought to arrange their material according to some kind of scientific order. The Dresden palace of Augustus I had seven rooms occupied by his museum material. Illustrations courtesy Historical Pictures Service—Chicago.*

real as the physical things in one's own home. The imitations one finds in some museums, the reproductions, the models, prove this rule, since immense care is taken to create verisimilitude.* The common distinctive characteristic of museums, then, is their role as keepers of actual physical objects—not of descriptions or depictions of objects—that prior to their imprisonment had careers outside museum walls.

With this in mind, we will learn more about what museums are good for if we imagine a world in which one would not expect to find them. The 16th-century French village to which Martin Guerre re-

**A museum of scale models of railroads is not a railroad museum; it is known as a museum of model railroads: a museum of* real models, *not of surrogate locomotives and cars.*



Typical of seventeenth-century natural history museums was this "wonder room" of Olaf Worm, a Copenhagen physician and famous student of natural history. From a woodcut made for the frontispiece of Worms's 1655 catalog.

turned surely is such a place. Every painting known to the villagers looked more or less like a Breughel; one person's experience with natural objects and artifacts was hardly distinguishable from another's; every villager had essentially equal access to the mysteries of the crafts and trades. Distant lands with different dress, weapons, implements, houses, flora and fauna, and customs were at best dimly known to exist. Nor was there genuine access to a past different from the 16th-century present. What point, then, would there have been to single out a set of special objects for contemplation by the villagers? No more than converting one's own living room, today, indistinguishable from one's neighbor's, into a museum. There may have been an exception in the village of Martin Guerre, but it, too, would prove the rule: a cabinet of curios in the richest man's house; the hairs and bones of a local saint in the church's reliquary.

In the world in which there are museums, life experiences differ from each other, depending on where and when people live, on their occupations, roles and stations. Museums, in this familiar world, bring us into the presence of objects that belong to lives different from ours and give us an opportunity to become directly acquainted with them.

When we read accounts or see depictions of other times and places, our knowledge is extended beyond our own experience. The words we read and the pictures we see convey to us something of what those places, distant in time and space, are like. But when we are brought into the presence of actual objects, our own experience is extended more directly than it is by description or picturing. Hence the im-

Seventeenth-century painting of the South Lambeth (England) home of the Tradescant family, popularly known as "Tradescant's Ark," which served as a repository for natural history specimens as well as for coins, objects of historic interest, and sundry manufactured goods. Acquired by Oxford University in 1682, the Tradescant collection formed the foundation of the Ashmolean Museum. A copy of the Tradescant 1656 catalog is in the Field Museum collection

portance of authenticity. Only real things will really stretch our experience. Authenticity, therefore, becomes *more* important, not less, in a world that has become ever better at simulating and reproducing with remarkable verisimilitude natural objects, artifacts and even works of art.

On this account, the distinctive trait of a museum is to be a repository of authentic objects from different times, places and domains. But what, then, is the function of museums? What is the point of our direct encounter with the things they house? Three broad, interrelated functions seem to me distinctive of museums, granted that there is as much variety within them as there are different types of museums. I distinguish a scholarly mission, an entertainment function, and an educative one.

To get a sense of the scholarly importance of museum collections requires understanding the role of firsthand experience in scholarship generally. Anthropological inquiry, to take an example, rests on direct observation. Typically, anthropologists live with the people they study and write about. Historians, who cannot travel in time, must work with reports about the past, especially accounts contemporary with their subject matter. More important still are primary sources—the actual traces left by the past, whether in the form of documents, artifacts or buildings. Art historians are notoriously dependent in their work on the physical survival of the objects of their concern, with copies or reproductions largely unavailable until the invention of photography and related techniques and still inadequate for serious scholarship.

How museum collections support scholarly pursuits like these is quite obvious. Archeological and anthropological collections extend the range of a field worker's experience. Museums of many different kinds offer precisely the repositories of different kinds of spoors of the past that constitute the primary evidence for the constructing of historical inference

chains. Without art museums art history, as that discipline is conducted, would be unthinkable.

A visit to a museum, with magnifying glass, measuring devices and other instruments of examination, is in many ways not as good as being on the scene itself. On the other hand, a museum also improves on original situations because it offers to a scholar a coherent collection of objects otherwise temporally and spatially scattered. But in any case, direct encounters with authentic objects belonging to the experience of other lives are a powerful and necessary supplement to the paler evidence of reports.

Entertainment of a certain kind is a quite different function of museums. While I hesitate to use that word (for fear of being thought frivolous), it is surely justified, assuming Mozart divertimenti are properly so-called and that we are entertained when we see *A Midsummer Night's Dream*. In a similar way, a visit to a museum can be amusement, an occasion of pleasure.

We want to be sure about two characteristics of this entertainment associated with museums. First, like any real entertainment, it must be enjoyable in itself. Whatever we may learn from a visit to a museum (or whatever other desirable consequences that occasion may have), we are talking about the experience of looking at a museum display insofar as it is itself pleasurable. Second, we must insist that the only pleasure which is here relevant is one that has its source in the collections of museums; only entertainment with roots in what properly belongs to museums is distinctive of those institutions.

Many different kinds of enjoyment may of course be derived from the objects exhibited in museums. Esthetic pleasure having its origin in looking at the paintings and sculptures of an art museum is a clear example, though such pleasure need not only stem from what is conventionally referred to as "art." Esthetic pleasure, or something very akin to it, also has its source in works of craft. Take beautiful Indian baskets or gorgeous ceremonial robes but also vintage automobiles or gleaming models of nineteenth-century steam engines. Very similar responses may be evoked by objects of nature, such as in displays of the plumage of tropical birds or collections of semiprecious stones.

Indeed, things need not be beautiful or even pretty to be ingredients in an experience that is val-

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Newspaper ad for Phineas T. Barnum's "American Museum" in Manhattan in the 1850s. More carnival than museum, Barnum's enterprise devoted itself to satisfying public demand for entertainment, which remains a primary mission of museums today

ued for its own sake. (Is *King Lear* beautiful? Picasso's *Guernica?)* We prize the interestingness of things, for example, their startling differentness from the familiar; we enjoy quaintness. Perhaps such values are not near the top of the moralist's scale, but they certainly play an important role in our lives and they are an ingredient in the entertainment function of museums.

The third function of a museum is educative. With it, that institution has its broadest social impact. I want briefly to look at some different ways in which museums educate, while remembering throughout that all museum learning must be characterized by the presence of authentic objects.

Visits to museums teach us quite specific things. We say about this unproblematic sense of "education" that, as we peruse an exhibit, we acquire information about some segment of the past: about an industrial process, about the art of medieval Siena or about the festive dresses of Scottish Highlanders. But that repeated "about" is misleading. Books give information about their subject matter; discourse refers, is *about*, things. Museums, instead, make us *acquainted* with things, so that we get to know those objects, rather than just learn about them. While we infer information from our viewings and derive it directly from labels and explanatory materials, the special quality of this learning resides in the directness of our experience.

Museums also educate in a broader sense, although that sense assumes and includes the specific function just mentioned. Because in museums we are confronted by objects that are especially collected and selected for display, the direct experience of which I spoke is not readily found outside museum walls. A visit to a museum, when it works well, is like a voyage into different times or places, or even like a trip into regions that are subdivisions of a conceptual map rather than a geographic one. Like real travel, such experiences can stretch the mind and enlarge the imagination by acquainting us with possibilities that lie beyond our own time- and place-bound experiences. If travel is educational, so are visits to museums.

The educative function of museums can help combat two all-too-familiar responses to the perception of real differences in the world, whether in dress or custom, moral values or ways of conducting daily life, or artistic styles. One such response is provincial: supposing that what is different from the familiar is to be dismissed or even scorned. Museums can help, literally, to open our eyes and give us a bit of precisely that direct experience which creates familiarity and thus contributes to that understanding of differences which leads to appreciation.

Museums can help in combating a second, more modern, conventional response to differences: call it mindless cosmopolitanism. This attitude takes everything to be equally good and finds no differences of value in the immense variety of customs, modes of life, and styles that have been generated by a world that never stays the same.

"Museums . . . make us acquainted with things, so that we get to know those objects, rather than just learn about them."

Our discussion has moved us into the broader aspect of education that we might call the inculcation of taste. Because managing successfully in a post-industrial society calls for a great deal of information and for a goodly number of complex intellectual skills, we think that all education must produce such results. But in the daily choices we make in moral, political esthetic matters, we reflect both the values we have acquired and our ability to discriminate, judge and evaluate. Making judgments and evaluations, too, is something that is learned, so that education is relevant to this formation of taste in the broad sense.

Here again, museums are relevant. Taste is acquired in the experiencing of objects, whether wines or paintings, and not simply by means of discourse *about* things and situations. The role of art museums is obvious in a person's acquisition of taste in works of art; but the numerous other worlds that are opened up to the museum visitor can play a similar role in our ability to discriminate, assess and judge. The museum helps to form taste, because it is only once-removed from an unfettered world and can thus play a significant role in the shaping of our evaluative faculties.

The distinctive role of museums, I have said, consists of the interrelated functions of particular kinds of scholarship, entertainment and education. A number of things follow about what museums should be doing if they are to play their roles well.

First, they should undertake those things that will support an appropriate form of scholarship. Here the most fundamental task is to collect in a systematic way the objects that belong to the museum's domain —paintings, fossils, printing presses or whatever. Without collections, a museum is nothing. But pack rats are not yet curators. To build a collection requires a viewpoint as to what does and does not matter. Collecting *itself* is a scholarly activity. Astute selection of objects belonging to a domain can itself make important contributions to knowledge and insight. What is collected must be preserved. The maintenance, repair, restoration and housing of collections call for more care and feeding than are needed by thoroughbred horses. There is no point in collecting, if these jobs are not well done.

If a museum's collection is to be of use to scholars within or outside the museum, yet another set of handmaidenly activities (that are themselves scholarly) are required. The notion of a collection not only implies principles of coherence; access to it presupposes order. A heap, however well its components were selected, does not support scholarship, and shrewd juxtaposition provides more insight than mere mechanical exposition. But even an ordered collection can be more or less intelligible. This is where the complex job of identifying, labeling and cataloging comes in: the basic and necessary scholarly activities of museums. If museums do not perform them, they are not likely to be performed at all.

The second function of museums I have singled out is entertainment, with the pleasure provided by the museum's collections. The basic museum activity relevant here is exhibiting. Well-designed exhibits make a museum's objects attractive to the public— the notion of design covering everything from the very conception of an exhibit and the selection of the objects to be displayed, to placement, lighting and labeling. Without attractive packaging, the public— which lavishes only short spurts of time on museum collections—will not be entertained.

Museums, I believe, are right to cater to the public and to mount pleasantly or even dramatically designed exhibits of their wares. They should remember, however, that the functions of entertaining and educating overlap. It is far better to amuse with a display that also fulfills a higher teaching role than by means of one whose educational role is trivial.

The entertainment function of museums can be a trap, because it is all too easy to forget the *museum* in that formula. Then, as elsewhere in the entertainment industry, the clicks of the turnstile become the measure of success: magicians, comedians or chefs for the eye or tongue become the magnet that makes those turnstiles move. When this happens, museums find themselves in futile competition with entertainers who are much more skilled and far better paid, while at the same time they arouse expectations in the public that make it ever harder for them to return to their own mission.

The educational function of museums is the broadest, since it encompasses the other two. It is also the primary concern of many of the professionals who staff museums, as well as of the institutions, public and private, which support them. That educative function, I have said, consists of informing and enlightening by means of the museum collections.

"The [museum's] most fundamental task is to collect in a systematic way. . . ." Melvin A. Traylor, curator emeritus of Birds, shown in earlier photo while unpacking shipment of bird skins.

Another quick look is needed at the special character of this transaction, if we are to see what needs to be done to have the educative function performed well.

The objects themselves, I repeat, should educate by having the learner become directly acquainted with them. This special character of education in the museum is also the source of a weakness. Things do not speak for themselves; they must have a spokesman, they must be referred to in discourse. Two poles of a continuum might thus be characterized, neither pole describing the educational activity of a museum. One end consists of a heap of objects that, however well collected, remains unintelligible and therefore cannot educate. At the opposite pole is pure discourse. It is intelligible and thus informs and teaches, but because it does not provide direct experience of objects, such discourse is not an education that is distinctive of museums.

The educational activities of museums lie between these two poles. We move away from the pole of incomprehensibility by introducing not only coherent ordering of objects, but also labeling and explanatory phrases—the guideposts that permit us to derive understanding from objects. Things don't mean; discourse does. An exhibit that educates uses words to release the power of things by having us come to know just what we are becoming acquainted with.

As we move further towards the pole of discourse, we reach the exhibition catalog, on the one hand, and the docent's lecture, on the other. Both are discourse that refers to, and is illustrated by, the real objects that are part of the basic world of the museum.

But this way of looking at the educational functions of museums suggests an entire area that at this time remains sadly underdeveloped. Our museums reverberate with the noise made by crowds of children from primary schools, led from display to display by their teachers or members of the museum's staff. These goings-on can readily be located on our continuum: words illustrated by objects; objects

informed by a meaning provided by a discourse that explains and links them. But why is this valuable activity arrested barely above the level of sixth grade? It would seem that the educative activity most central to museums is to have their collections play a role in *all* of education, but especially in learning in secondary school and undergraduate study, as well as in the specialized pursuits of graduate work. What we take for granted about libraries—that they must be integrated into all facets and levels of education—is equally appropriate for museums, or at least for many of them.

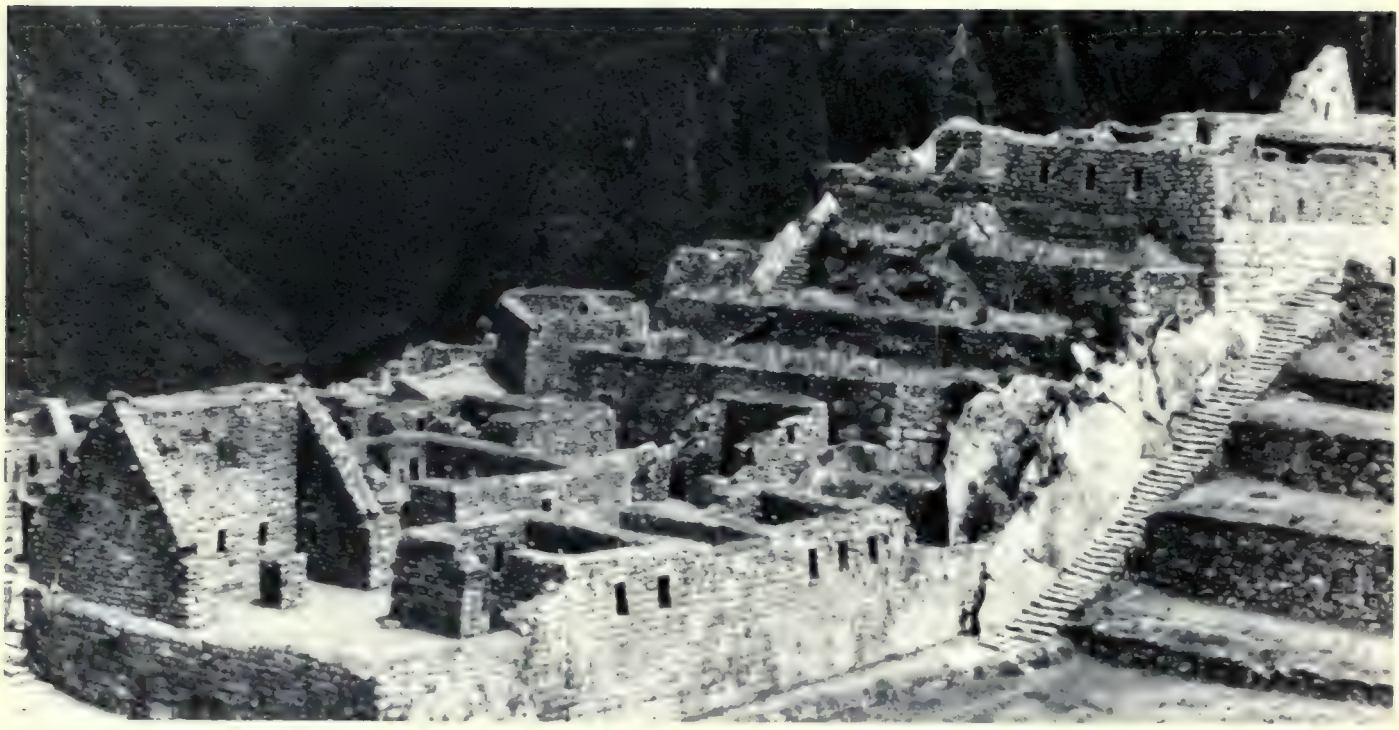
The educational programs of museums all too often ignore the distinctiveness of their role. Frequently, their lectures and courses are merely more or less adequate imitations of those properly developed in educational institutions of various levels. To the extent that museums mount educational programs that are indistinguishable from those of other institutions, they divert energies and resources from their proper educational mission, and to that degree leave this distinctive function unperformed.

Conventional education is very word-dependent, and conventional educators seldom have the ability and training to break far out of the web of discourse. It is in the world of museums that we find persons who have the knack of teasing information out of things, who know how to marry discourse and direct experience of physical objects. We are dependent on the staffs of museums to take the initiative in making acquaintance with objects of nature and artifacts a more important part of education at all of its levels. Such integration is at the center of the distinctive educative function of museums.

Museums are not as unitary in their distinctive mission as Phillips screwdrivers: there are many things that *only* museums can do or that only museums can do reasonably well. Nevertheless, there are limits to the proper function of museums, and straying beyond them exacts its price. Chopping ice with that screwdriver mars its blades. The pursuit of irrelevant goals hampers the effectiveness of museums. The issue of resource allocation is clear: what is devoted to the peripheral is not there to be spent on the central, and an important function remains unperformed. More subtly, confusion within the museum infects a broader public outside it and fosters the belief that nothing of value is distinctive of that institution, that others can readily do what it does. What museums are good for is important. Reflecting on that mission may help the better to fulfill it. FM

"Direct encounters with authentic objects belonging to the experience of other lives are a powerful and necessary supplement to the paler evidence of reports."

TOURS FOR MEMBERS



Peru's fabled "lost city" of Machu Picchu. Hermann C Bowersox

Archaeological Tour of Peru And of La Paz, Bolivia

October 7 to 24
$3,195

Discover the cultural and natural diversity of Peru (and a little bit of Bolivia too), under the guidance of a Field Museum archaeologist/anthropologist who has lived and worked in that country. Tour participants will be drawn into the fascinating, seemingly alien world of the original inhabitants of the South American continent by walking among the ruins of their once-great cities. Our leader will help you experience much more than what is encountered by the conventional sightseer as you view the incredible wonders of ancient Cuzco, Colonial Lima, and the Inca ruins of Puruchuco. An overnight excursion to the famous "lost city" of Machu Picchu, as well as a visit to the Chinchero Sunday market will be a memorable weekend.

An added bonus will be our pioneering two-day stop at the recently discovered archaeological site in the Moquegua Valley in which Field Museum will play a major research role. We'll complete our tour with a visit to Bolivia, a hydrofoil ride across Lake Titicaca, and a visit to the city of La Paz. Here we'll tour the nearby ruins of the Tiahuanaco civilization. We invite you to join us and to get an insider's view of the past and present.

Our tour leader will be Dr. Robert A. Feldman, research archaeologist for the Field Museum Ancient Irrigation Project and currently director of "Programa Contisuyu." He has done field work in the U.S. and Peru. Before joining the Field Museum project, Dr. Feldman conducted excavations at a 4,000-year-old fishing village on the Peru coast, uncovering some of the earliest monumental architecture in South America.

Ancient Capitals Of China

September 22 to October 13
$3,550

We are pleased to again offer our unique itinerary for China, with the addition of a two-day visit to Wuxi and Nanjing and a Grand Canal cruise from Wuxi to Suzhou. This program also

TOURS FOR MEMBERS

includes the most significant sites of early Imperial China and will provide an opportunity to explore in depth the civilization which characterized one of the oldest and longest-lived societies on earth.

Following our direct flight from Chicago to Tokyo, where we will spend the night, we will visit Beijing for three days, then to Xian for three days. Successive points in the itinerary then include Luoyang, Zhengzhou, Kaifeng, Nanjing, Wuxi, Suzhou, and Shanghai.

Mr. Phillip H. Woodruff, Ph.D. candidate in Chinese history at the University of Chicago, will be our guest lecturer. Mr. Woodruff has recently returned to Chicago after two years of research at Beijing University. His experience of living in China, his fluency in Chinese, and excellent rapport with the Chinese guides are a superb supplement to his leadership skills. This is the fifth China tour he has led for Field Museum.

China Tour, Sept. 22 to October 13.

Stanton R. Cook, courtesy *Chicago Tribune*

Kenya

September 8 to 27
$3,595

You are invited to join us for an exciting 19-day safari to East Africa accompanied throughout by Audrey Faden, experienced lecturer and tour guide, plus local guides. Game is still plentiful and this tour is scheduled to coincide with the animal migration. It will be Spring in Kenya. The time to go is now! A trip to Kenya is a vacation that never ends. We hope you will make your reservation now.

Kenya Tour, September 8-27.

Start planning now for...

Tour of Egypt

February, 1985

If you wish to be placed on the mailing list for this perennially popular tour, or if you have questions about any of the other tours, please write or call Tours Manager Dorothy Roder, Field Museum, Roosevelt Rd. at Lake Shore Dr., Chicago, Il 60605. Phone: 322-8862.

001F288
Edith Fleming
946 Pleasant
Oak Pk , IL 60302

FIELD MUSEUM OF NATURAL HISTORY BULLETIN

October 1984

Members' Night October 12
Dinosaur Days October 20, 21

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I [illegible] made by me above are correct and complete. *Jimmy W. Croft*, vice president for Finance and M[illegible]

CONTENTS

October 1985
Volume 55, Number 9

October Events at Field Museum 3

Members' Nights 5

Pacific Research Lab: A New Look, Thanks to NSF 6

Social and Unsocial Behavior in Dinosaurs 10
by John H. Ostrom

Pigeon Whistles 22
by Berthold Laufer

Field Museum's Planned Giving Program 24
by Clifford Buzard, Planned Giving Officer

Field Museum Tours 27

COVER

Fossilized skeleton of dinosaur Protoceratops andrewsi, *on view in Hall 38. October is "Dinosaur Month" at Field Museum. Check "Dinosaur Days" (Oct. 20, 21) activities in "Events" section, pp. 3,4.*

Invitation for Volunteers

Field Museum needs people with special skills who can volunteer one day a week with a minimum commitment of one year. If you are interested in sharing your love of natural history with youngsters, you might become a "Place for Wonder" volunteer. The Pawnee earth lodge needs volunteers with public speaking ability and a special interest in Native American culture.

Zoology needs weekday volunteers who can type or who are willing to work with alcohol specimens in the Fishes or Reptiles Divisions. Weekday volunteers are also needed in Membership, Public Relations, and Planning and Development.

For more information please contact the Volunteer Coordinator at 922-9410, extension 360.

Events

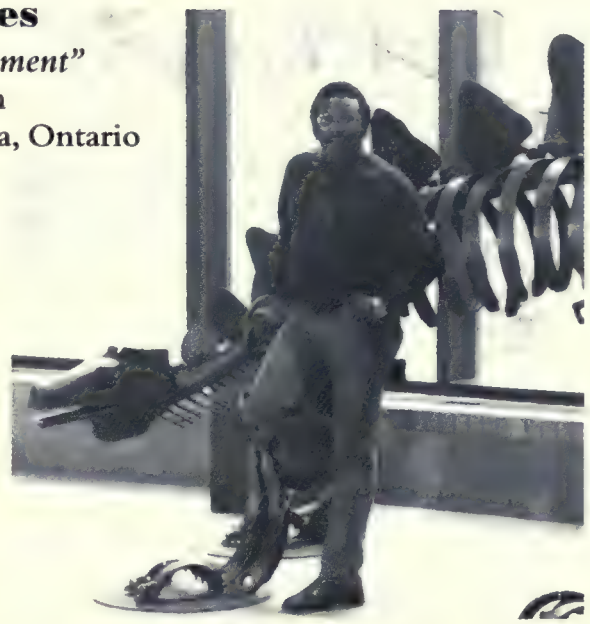
Dinosaur Days—Feature Lectures

"Dinosaurs: An Alternate Evolutionary Experiment"
Dr. Dale Russell, Chief, Paleobiology Division
National Museum of Natural Sciences, Ottawa, Ontario
Saturday, Oct. 20, 2:00pm, James Simpson Theatre

Dinosaurs may have vanished abruptly approximately 65 million years ago. What brought about their demise? There are numerous theories. According to one viewpoint, this mass extinction may have been aided by a huge asteroid hitting the earth's surface. The great extinction of reptiles prevented them from further evolution. It can be speculated that they would have achieved human levels of brain complexity had they survived extinction. Join us as paleobiologist Dr. Dale Russell presents his provocative theories of the process of evolution—what dinosaurs would look like today and whether or not life evolves in the exotic biospheres of distant stellar systems.

$5.00 (Members: $3.00)

This program is funded in part by the Ray A. Kroc Environmental Foundation. Fees are nonrefundable.



Jim Gary

Moderator: Dr. Dale Russell
National Museum of Natural Sciences, Ottawa

Panel: Dr. John R. Bolt
Field Museum of Natural History

Dr. James O. Farlow
Indiana-Purdue at Fort Wayne

Dr. James A. Hopson
University of Chicago

Dr. Jack Sepkowski
University of Chicago

(For more on Dinosaur Days programs—Oct. 20, 21 —see page 17)

"New Fossils—New Evidence"
A Conversation with the Curators
Sunday, Oct. 21, 2:00pm, James Simpson Theatre

Recently new dinosaur fossils have been discovered that give us clues and information about how these creatures behaved. Nests, eggs, skin impressions and the fossils of juvenile dinosaurs are providing evidence about the everyday lives of dinosaurs. In an informal conversation, leading scientists discuss these new discoveries and present current theories about life during the "Age of Reptiles".

This program is free with Museum admission.

Family Feature

Halloween Legends and Masks
Saturday and Sunday, October 27 and 28, 1:00-3:00pm
Stanley Field Hall, Main Floor

Halloween celebrations began more than 2,000 years ago, in what is now Great Britain. The Celtic people held a festival in honor of Samhain, the Celtic lord of Death. During their celebration, people wore costumes made of animal skins and told fortunes of the coming year. This celebration of Halloween has changed tremendously over the years. Listen to the legends and customs that have accompanied the celebration of this holiday throughout the centuries. Make a mask of a character that you can trace to these ancient legends for your own Halloween celebration.

Family Features are free with Museum admission and tickets are not required.

CONTINUED ›

Events

CONTINUED FROM PAGE 3

October Weekend Programs

Each Saturday and Sunday you are invited to explore the world of natural history at Field Museum. Free tours, demonstrations, and films related to ongoing exhibits at the Museum are designed for families and adults. Listed below are only a few of the numerous activities each weekend. Check the *Weekend Passport* upon arrival for the complete schedule and program locations. The programs are partially supported by a grant from the Illinois Arts Council.

October

6 11:30 am. *Ancient Egypt.* (Tour) Explore the tradition of ancient Egypt from everyday life to myths and mummies.

7 12:30 pm. *Museum Safari.* (Tour) Seek out shrunken heads from the Amazon, mummies from ancient Egypt, and big game from Africa.

13 1:30 pm. *Red Land/Black Land.* (Tour) Examine the geography of the Nile Valley and its effect on the lifestyle of the pharaohs, the religious practices of the priests, and the reason for mummification.

2:00 pm. *Traditional China.* (Tour) Examine the timeless imagery and craftsmanship represented by Chinese masterworks in our permanent collection.

14 12:00 noon. *World of Dinosaurs.* (Tour) Focus on the Museum's public dinosaur collection and cover the basic facts plus some speculation about these ancient reptiles.

1:00 pm. *People of the Long House.* (Slide lecture) Look at Iroquois culture, relationships with Europeans and other native groups and their survival with both adaptability and grace.

21 1:00 pm. *Welcome to the Field!* (Tour) Enjoy a sampling of our most significant exhibits as you explore the scope of Field Museum.

28 12:30 pm. *Museum Safari.* (Tour) Seek out shrunken heads from the Amazon, mummies from ancient Egypt, and big game from Africa.

These weekend programs are free with Museum admission and tickets are not required.

Edward E. Ayer Film Lectures

Travel the world on Thursdays in October at 1:30 pm in James Simpson Theatre. Admission is free. Doors open at 12:45 pm. Members please bring membership card for priority seating privilege.

October 4 — *"South American Venture,"* with Rudy Thuran

October 11 — *"Timbuktu and Beyond,"* with William Stockdale

October 18 — *"Argentina,"* with Clay Francisco

October 25 — *"Switzerland and the Alps,"* with Andre de la Varre

Registration

Please complete coupon for your program selection and any other special events. Complete all requested information on the application and include section number where appropriate. If your request is received less than one week before program, tickets will be held in your name at West Entrance box office until one-half hour before event. Please make checks payable to Field Museum. Tickets will be mailed on receipt of check. Refunds will be made only if program is sold out.

Program Title	Member Tickets #Requested	Nonmember Tickets #Requested	Total Tickets #Requested	Amount Enclosed
			Total	

Name

Street

City State Zip

Telephone Daytime Evening

Have you enclosed your self-addressed stamped envelope?

For Office Use:

Date Received **Date Returned**

Return complete ticket application with a self-addressed stamped envelope to:

Public Programs: Department of Education
Field Museum of Natural History
Roosevelt Road at Lake Shore Drive
Chicago, IL 60605-2497

Members' Night

"Night of the Living Field"

Friday, October 12
5:00 to 10:00pm

Come and unearth the wonders of a night in the living field. We'll be turning over the timeless treasures buried in our "Back 40" (a.k.a. Stanley Field Hall), especially for you. They'll be dinosaurs and daguerrotypes, curators, and cocktails, mummies and music, appealing activities, and acres and acres more.

And if that's not enough, you come prepared to dig a little, and we'll plant some good seeds of our own with the annual Behind-the-Scenes activities (from 5:00 to 9:00pm). You'll meet our scientific and creative teams and visit those *staff only* areas the general public never sees, as you begin to cultivate your own ideas abut how natural history can *really* work for you.

So, put this Members' Night on your calendar: *Night of the Living Field*—it might just be food for thought.

Added Attractions:

☞ Live music will be provided in Stanley Field Hall by the Franz Benteler Orchestra under the baton of Ted Knight.

☞ The Museum Stores will be open 5:00 to 9:00pm, with an exclusive Mark McMahon poster of Field Museum available in the main shop.

☞ Enjoy fully catered dinners or short-order meals and snacks in our specially prepared Ground Floor dining areas. Full food service will be available 5:00 to 9:00pm.

☞ Members wishing to bring a guest may do so for the general admission fee, payable at the north or south entrance.

☞ Special arrangements for the disabled can be made by calling: 922-9410, ext. 454, October 1 to 9.

☞ Free parking is available in the Museum's north lot and the Soldier Field lot: Just show your member card and the parking is on us.

☞ For those not arriving by car, we suggest our free round trip charter bus service operating between The Loop and our south door. CTA busses marked "FIELD MUSEUM" originate at the Canal Street entrance of Union Station (Canal at Jackson), and stop at the Canal Street entrance of Northwestern Station (Canal at Washington); Washington and State; Washington and Michigan; Adams and Michigan; and Balbo and Michigan. Buses will run circuits beginning at 4:45 PM and continue at 20-minute intervals until the Museum closes at 10:00 PM (Buses will travel to the train stations until the departure of the last train.) You may board the free "Field Museum" CTA bus by showing your membership card.

A New Look for the Pacific Research Lab

National Science Foundation Grant Underwrites the Improvement Of an Important Research Facility

Photos by Ron Testa

A major advance in the storage of anthropological materials at the Field Museum has now been achieved with the reorganization and renovation of the Pacific Research Laboratory, a facility with some 35,000 objects from Australia, Melanesia, Polynesia, Micronesia, Indonesia/Malaysia, and Madagascar.

The important project, initiated in 1981, was made possible by a $168,800 grant from the National Science Foundation. Codirectors of the project were Phillip Lewis, curator of primitive art and Melane-

Phillip Lewis examines barkcloth headdress-mask from the Baining of the Gazelle Peninsula of New Britain. Large, unwieldy objects are suspended from lightweight conduit and chains with cotton gauze and cheesecloth slings.

Tapa storage, showing barkcloth strips from the Pacific rolled around acid-free cardboard tubes, wrapped in plastic, hung on conduit. Flat tapas are stored below.

sian ethnology, and Phyllis Rabineau, custodian of collections, Department of Anthropology. Staff members who worked on the project were Kathleen Christon, Christine Gross-Taterka, E.B. O'Malley, Beth Koenen-Seelbach, Maryanne Schoch, and Col. Millard Rada.

Before reorganization the Pacific Research Lab was equipped with 10,525 sq. ft. of shelving, an insufficient amount to properly accommodate the collection. In many cases fragile objects were stacked up in layers, resulting in abrasion to wood, fibre, and delicately painted surfaces. Other objects were given insufficient support to maintain their structural stability. Plaited mats were folded in several places, causing breakage of their constituent fibres. Oversize tapa cloths were draped over rods and in danger of stretching. Feather ornaments were crushed in insufficient drawer space.

During the grant-funded reorganization project, shelf area was increased by almost 70 percent. Three thousand sq. ft. of new shelving were purchased, and this was supplemented with 4,000 sq. ft. of used shelving already on hand, interleaving the additional shelves within the old arrangement. This increase in shelf area virtually eliminated the need to stack objects. Specialized storage equipment was also purchased or manufactured to accommodate objects that could not be placed on shelves: drawers for small objects, racks for vertical storage of spears and shields, horizontal racks for storage of rolled mats and tapa cloth. These units were fitted into the shelving system. Such equipment enables the museum to store

Collections Assistant Christine Gross-Taterka with New Guinea shields in special wooden racks. Horizontal steel angle iron is wrapped with bubblepak.

each object in a manner that best suits its physical needs, and in addition makes it easily accessible for research.

Additional specialized storage mounts were made to support fragile objects; polyethylene sheeting and foam, museum board, and bubblepak were used to protect some of these. The existing shelf uprights have fairly sharp edges and these were wrapped with bubblepak in areas where large items are stored, thereby reducing chances of damage through abrasion.

Many items within the Museum's Pacific collection are bulky or oddly-shaped. These include monumental house posts, very wide tapa cloths, large and delicate costumes made from tapa or bast, feather-trimmed flax cloaks, wooden feast bowls, and many other types. It was found that the proportion of such large and unwieldy objects was much higher for the Pacific collection than for any other segment of the Museum's holdings. Unusual storage methods were required for these items, challenging the expertise and ingenuity of the Museum's seasoned staff, but these problems were successfully solved during the project. In the most extreme example, delicate items were placed in muslin slings and suspended from the ceiling because there was no other way to properly distribute their weight. Very large racks were built in carefully chosen locations not only to accommodate large items but also to ensure that they could be removed from the room as needed.

Lighting throughout the storage area was improved by adding new fluorescent fixtures and installing ultraviolet filters.

All objects in the PRL were cleaned and their storage arrrangement was shifted to a rational arrangement based on provenience data. During the process of reorganization, recent acquisitions, which had been squeezed into unrelated spaces, were integrated in the proper sequence. A shelf numbering system was initiated and every object assigned a numbered location. When an object is removed from a

Phillip Lewis examines custom-built drawers built into shelving uprights. The drawers contain small items from Micronesia and Melanesia.

Christine Gross-Taterka inspects New Guinea spears in custom-built racks. Spear bundles are secured with cotton twill ties.

shelf its storage number can now be noted on a special form; a copy of the form is left in place of the object. This procedure facilitates the return of objects to their proper location. When data entry is completed on the computerized catalog, storage location numbers will be a part of each item entry.

The departmental computerized catalog is not yet in service, so automated data retrieval and sorting is not yet possible. However, work is progressing on this important process. Data entry and location updating have resumed, and the museum is planning an expansion of its computer facility. The PRL reorganization project, like the earlier storeroom renovations, used the results of work on a computerized catalog. The work teams used a computer printout containing all the contents of the storeroom in numerical order. As each artifact was handled, its catalog number was located in the printout, descriptive data checked, and its numbered storage location was entered. Thus, the new storage numbers are ready for input into the computer, and when updating is completed the computer will be able to generate shelf lists and other useful data sorts about the collection.

In addition to the tasks funded by the NSF grant, several other improvements were carried out with museum resources:

- Interior walls of the storage area were painted.
- The concrete floor was sealed.
- The work area just outside the storage area of PRL was redesigned to be used for processing accessions and loans, and as research space.
- The climate control system in PRL was retrofitted to assure an absolutely stable temperature and humidity (70°F and 50% RH). The techniques used to stabilize climate control in PRL will be used to help redesign other heating and airconditioning systems in the building.

The reorganized PRL is now much easier to work in. Objects are accessible, and can easily be located for research or exhibition. The staff is confident that the results of the grant will be of benefit to the collection for many years. Beyond supplying the actual cost of the tasks proposed in the original grant proposal, the NSF grant has stimulated additional efforts to improve conditions for this important collection.

Storage bay for oversize specimens such as canoe prows and carved posts from New Guinea.

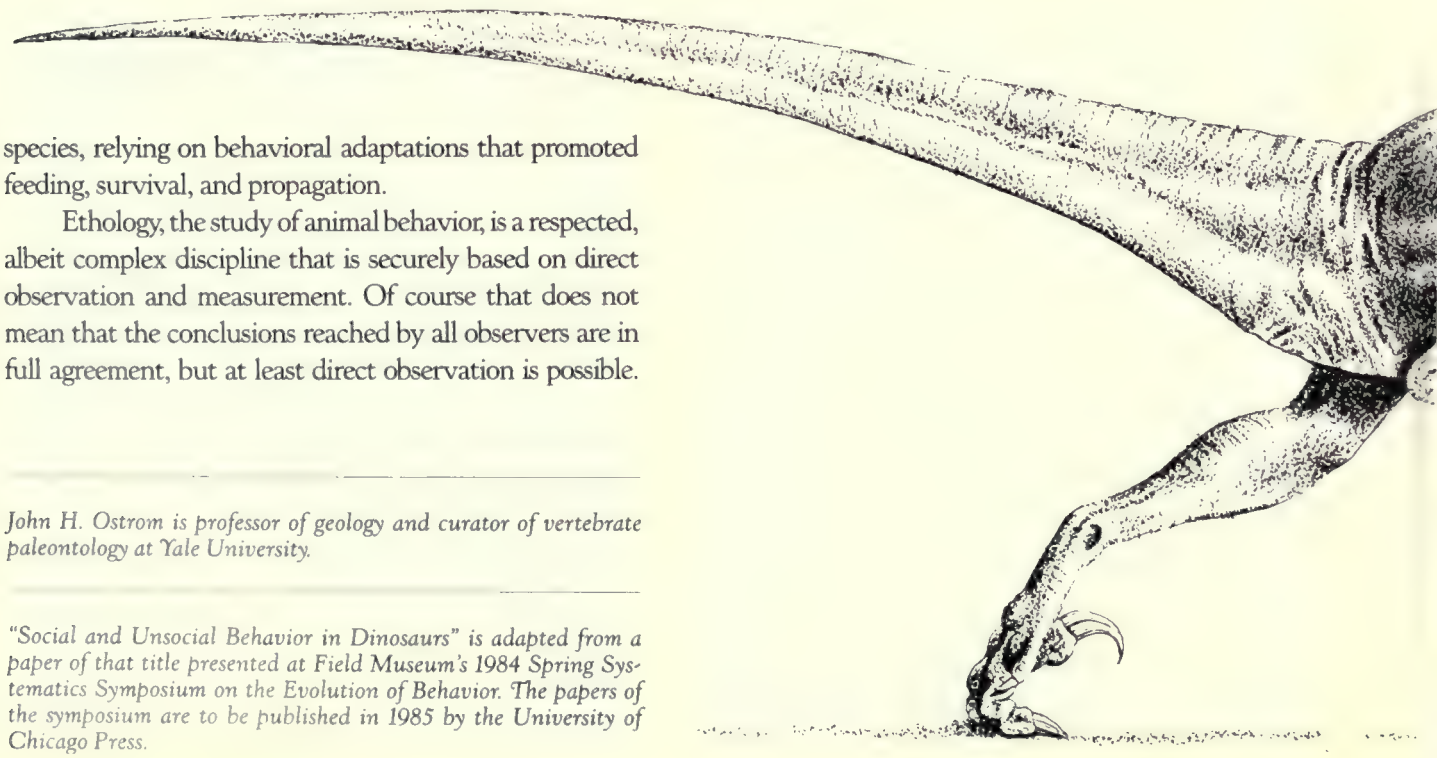
Social and Unsocial Behavior in Dinosaurs

by John H. Ostrom

To speculate about behavior among extinct animal species is dangerous business. Speculation about dinosaur behavior is even more hazardous, since paleoethologists are condemned to indirect evidence: the usually fragmentary skeletal remains, the sometimes conflicting taphonomic data (fossil associations and conditions of burial and preservation) and trace fossils (footprints and trails). Like beauty, the resulting interpretations are in the eyes of the beholder. Some dinosaurian carnivores seem to have been solitary hunters, while others apparently hunted in packs. A few, it is suspected, were limited to scavenging. Parental care of hatchlings may have been common practice, and group and herding behavior seems to have been widespread. Whether warm- or cold-blooded, there is even some evidence of rutting behavior in a few kinds, and both visual and acoustical display activity may have prevailed in others. As we intuitively suspected, dinosaurs seem to have behaved in ways not unlike those of many modern species, relying on behavioral adaptations that promoted feeding, survival, and propagation.

Ethology, the study of animal behavior, is a respected, albeit complex discipline that is securely based on direct observation and measurement. Of course that does not mean that the conclusions reached by all observers are in full agreement, but at least direct observation is possible. Pity the poor paleoethologist who has no observational data—no record of time budgets: no record of time spent in foraging versus resting; in hunting versus courting; guarding of territory and clan—or just hanging around.

At first glance, speculating about behavior of any kind—in any kind of extinct animal—would seem futile. A pure ethologist no doubt would categorize speculations on dinosaur behavior as absurd—just fantasies. The safest conclusion that I can come to is that dinosaur behavior must have been as diverse as the dinosaurs themselves, which came in many shapes and sizes. Included were carnivores and herbivores, quadrupeds and bipeds, terrestrial kinds and others that are thought by some to have been at least amphibious, if not fully aquatic. Most were huge, as we all know, but some (although perhaps juveniles—or even hatchlings) were small—the smallest were perhaps the size of a robin. So we should anticipate a corresponding diversity of behavior.



John H. Ostrom is professor of geology and curator of vertebrate paleontology at Yale University.

"Social and Unsocial Behavior in Dinosaurs" is adapted from a paper of that title presented at Field Museum's 1984 Spring Systematics Symposium on the Evolution of Behavior. The papers of the symposium are to be published in 1985 by the University of Chicago Press.

Approximately 300 genera of dinosaurs have been named (not all of them wisely) and placed in one of two orders, the Saurischia and the Ornithischia. Traditionally, the saurischians are further divided into three suborders: the prosauropods, the sauropods, and the theropods. The prosauropods were largely, if not exclusively, herbivorous and capable of standing or walking on their hind legs as well as on all fours (facultative bipeds); the sauropods, which includes the largest known dinosaurs, such as *Brachiosaurus*, were herbivorous and obligate quadrupeds (*i.e.*, confined to four-legged stance or locomotion); the theropods were carnivorous, obligate bipeds (*i.e.*, unable to stand or walk on all fours).

The order Ornithischia consists exclusively of herbivorous kinds allocated to four or five subcategories: the facultative bipedal ornithopods—and sometimes separated near-relatives, the pachycephalosaurs; the plated stegosaurs; the armored ankylosaurs; and the horned ceratopsians. The stegosaurs, ankylosaurs, and ceratopsians were all obligate quadrupeds. Within this array, we can draw inferences about a few kinds of behavior for some, and other behavior in others—depending upon the quality of the available evidence.

Reconstruction by R.T. Bakker of the pack-hunting theropod Deinonychus. *Noteworthy are the long claw-bearing hands and arms and the large sicklelike claw on each foot.*

Exactly what is the nature of the evidence that pertains to dinosaurian behavior? Briefly, it falls into three categories: anatomic—the fossilized skeletal remains (usually very incomplete), taphonomic, and trace fossils. All of these are *indirect* evidence only. No behavior patterns or time budgets can be observed. From these indirect data we can only infer—and what inferences any two observers will draw from these data may not be the same.

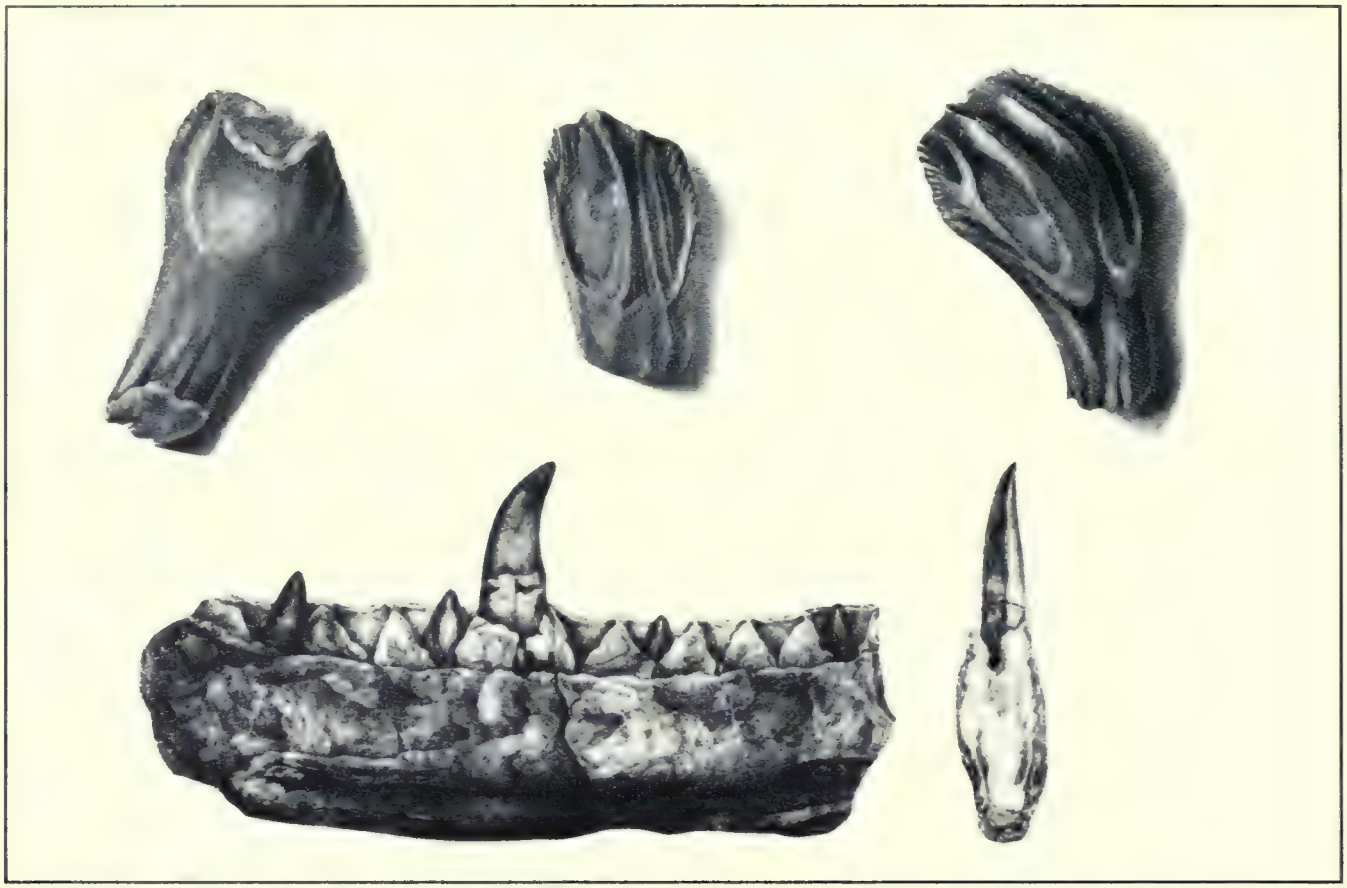
Behavioral Categories

Behavior may be a solitary activity or it may involve other members of the same species or others of different species. Both types of behavior can be categorized into several distinct kinds, such as feeding, defense, movement (pursuit, escape, migration, etc.), mating and courting, nursery maintenance, and so on. Because evidence is not available for all possible activities of all the main dinosaurian varieties, the following exercise is organized in terms of behavioral activities rather than by taxonomic groups.

Feeding Behavior

As Edwin H. Colbert has observed, "there is a definite relationship between the morphology of an animal and its behavior," and "Much of the behavior of animals is determined to a considerable degree by their physical adaptations."[1] Consequently, most of our inferences about dinosaur behavior derive from their skeletal remains and inferred functional morphology. That is nowhere more evident than in the dentition and is why we can say more about feeding behavior than any other activity. As is evidenced by tooth morphology, there were both flesh-eating and plant-eating dinosaurs. There is nothing new in this observation, but the figure on page 12 illustrates the obvious reasons for that conclusion.

The ornithischians all appear to have been herbivores, although recently discovered fragments which may be referrable to the genus *Troodon* might be an exception.[2] Nearly all ornithischian teeth were blunt without serrations and many show distinct grinding surfaces. Among the ornithischians, stegosaurs and ankylosaurs are enigmas as far as feeding habits or



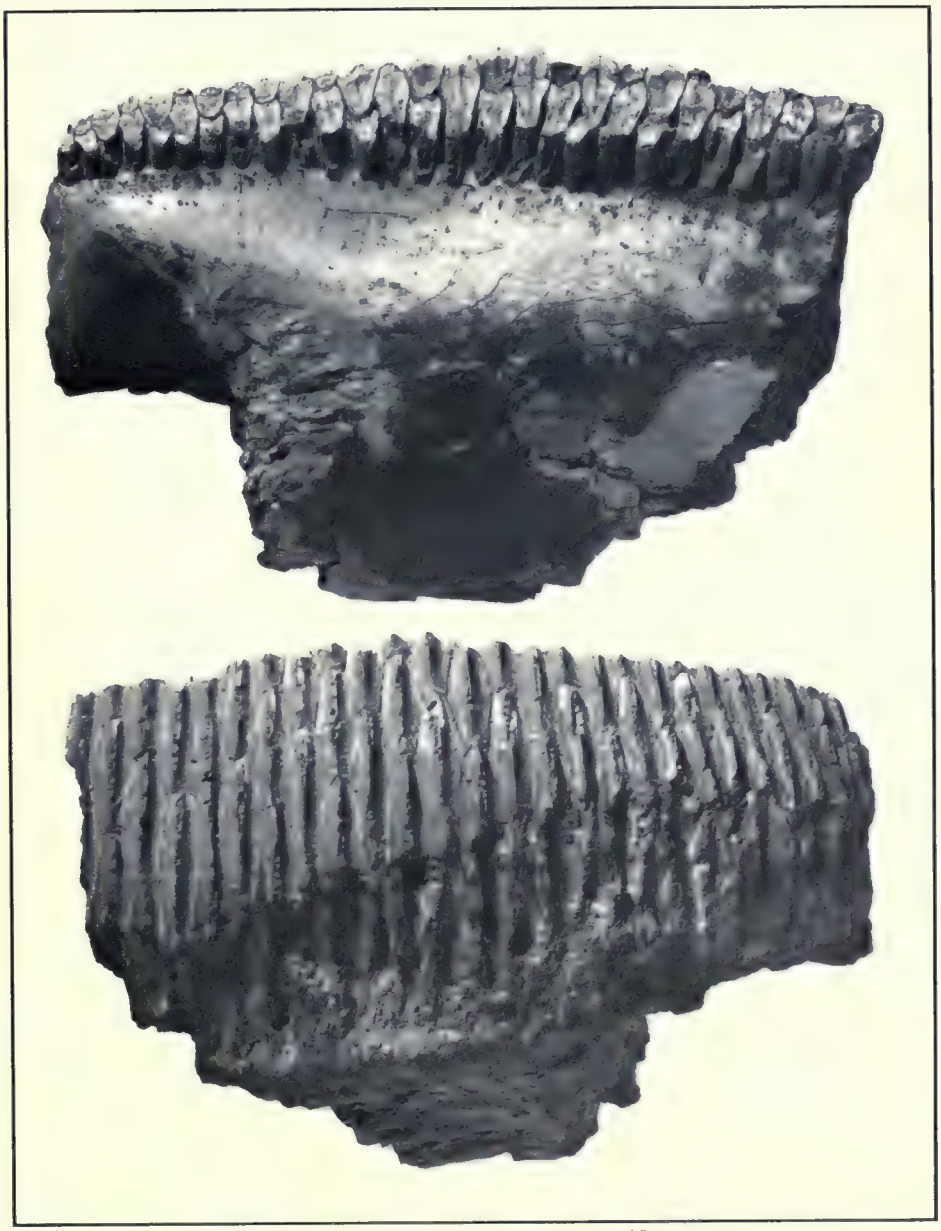
Comparison between teeth of plant-eating and flesh-eating dinosaurs. The three above are the blunt, grinding teeth of the herbivorous ornithopod Iguanodon. *Below are the right lower jaw and serrated, steak knife-like teeth of the carnivorous theropod* Megalosaurus.

preferences are concerned. Both were bulky quadrupeds that carried their heads low—presumably for browsing on low shrublike vegetation. Their jaws bore broad horny bills most likely used for plucking foliage, but the teeth behind were few in number and surprisingly small for such bulky animals. Whatever kind of vegetation they ate, it could not have been well chewed. Beyond this, we can deduce little about their feeding activity.

The bipedal ornithopods, on the other hand, were quite different. Their bipedal stance and progression could have increased their vertical foraging range, and may also have increased their running speeds. But it is their dentition that attracts attention. Early ornithopods of the Late Triassic and Earliest Jurassic—heterodontosaurs—featured surprising tooth differentiation: small nipping incisorlike front teeth, followed by prominent caninelike tusks, in turn followed by batteries of special grinding teeth behind.[3] The larger ornithopods of Early to Late Jurassic times had many robust teeth that commonly display distinct wear facets indicative of some degree of mastication. The Late Cretaceous ornithopod varieties ("duckbills," or hadrosaurs) featured highly specialized dental equipment and jaw mechanics. The dentitions show a high degree of occlusal wear and efficient tooth replacement, clear evidence of a sophisticated method of chewing food.[4] This is surprising in a *reptile*—by comparison with living reptiles. Some of the hadrosaurs reached large sizes, up to 5 m (nearly 17 feet) in bipedal height, and well designed for browsing on high conifers that were abundant in Late Cretaceous forests. Footprint evidence suggests they may have browsed in groups[5].

By contrast, the related ceratopsians, or horned dinosaurs, were heavy quadrupeds with very large heads carried close to the ground. Here too, the jaws featured specialized dental batteries located behind cutting, parrotlike beaks. The tooth batteries, though similar to those of the duckbills, display vertical occlusal wear facets that clearly indicate the dentition was for shearing or slicing, rather than for grinding.[6] We can only speculate about the preferred food, but it most probably was highly fibrous plant

tissue—perhaps low-growing cycads or palms. That image of a cycad-browsing *Triceratops* may be enhanced by noting the "enlarged" size of the skull with its posterior bony extension or frill. In some ceratopsians, this frill is more than half the total skull length.



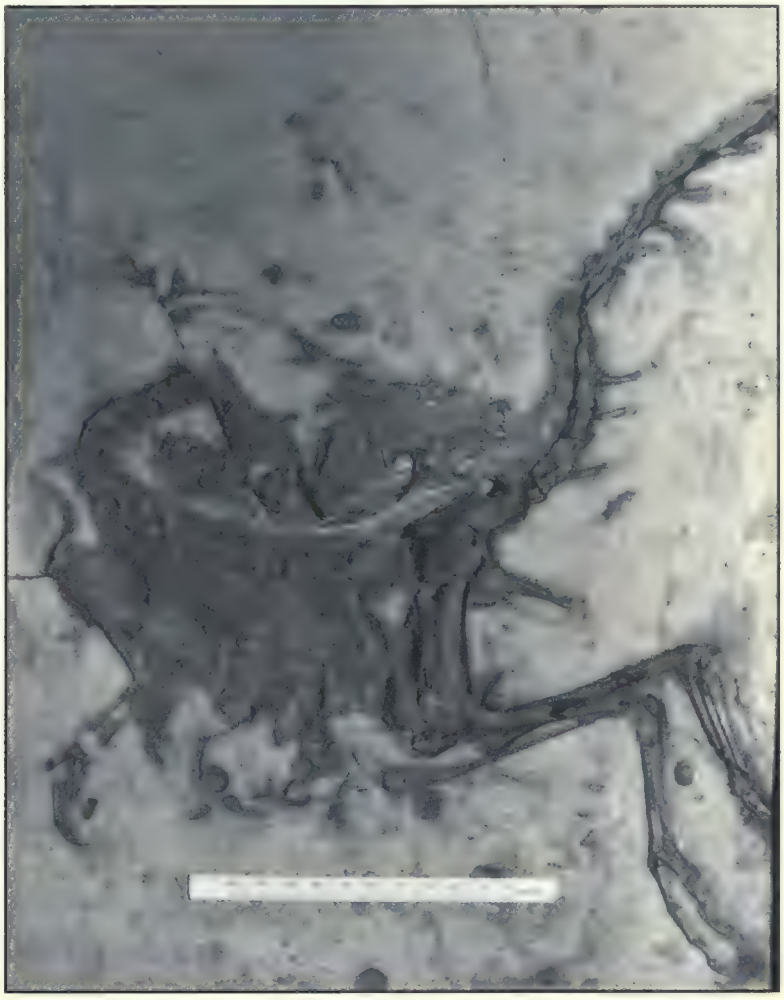
Dental battery of a hadrosaur (Anatosaurus breviceps, *Y.P.M. #1779), showing the distinct occlusal surface (above) and the remarkable supply of replacement teeth (below) beneath the worn functional teeth.*

Commonly the frill has been interpreted as a protective shield covering the vital neck region.[7] It has also been interpreted as an expanded muscle attachment site, allowing space for larger jaw muscles and adding power to the shearing mechanism.[8] The frill may well have served both roles, but some investigators have suggested that it had a display function.[9]

The most demanding vegetarians among the dinosaurs must have been the giant sauropods. With weights ranging from perhaps 10 tons up to 60 tons or more in *Brachiosaurus*, they must have been prodigious consumers—even if they were not endothermic, or warm-blooded. Paradoxically, they possessed no obvious dental specializations or other adaptations that might have enhanced their feeding efficiency.[10] Their elongated necks have traditionally (but not universally) been explained as an adaptation to permit breathing from a deep underwater position. A more realistic interpretation is that the long neck permitted browsing on high foliage.[11] That would seem to be an appropriate adaptation in the Jurassic-Early Cretaceous world, where nearly all other herbivores (stegosaurs, ankylosaurs, and most ornithopods) were low-level feeders.

The carnivorous dinosaurs, or theropods, have

formally been categorized (I think incorrectly) as large or small animals in two separate infra-orders, Carnosauria and Coelurosauria. That they both fed on flesh is evident from their teeth, which are slightly recurved, laterally compressed, and bladelike with serrated edges. With very few exceptions, there is no hard evidence that any particular species was a predator or a scavenger. Likewise, for most kinds there is no evidence about hunting strategy or killing techniques.



Skeleton of the chicken-size theropod Compsognathus *containing the articulated skeleton of a lizard* (Bavarisaurus). *The skeletal proportions of the consumed lizard skeleton compare most closely with modern fast-running ground-dwelling lizards such as* Cnemidophorus.

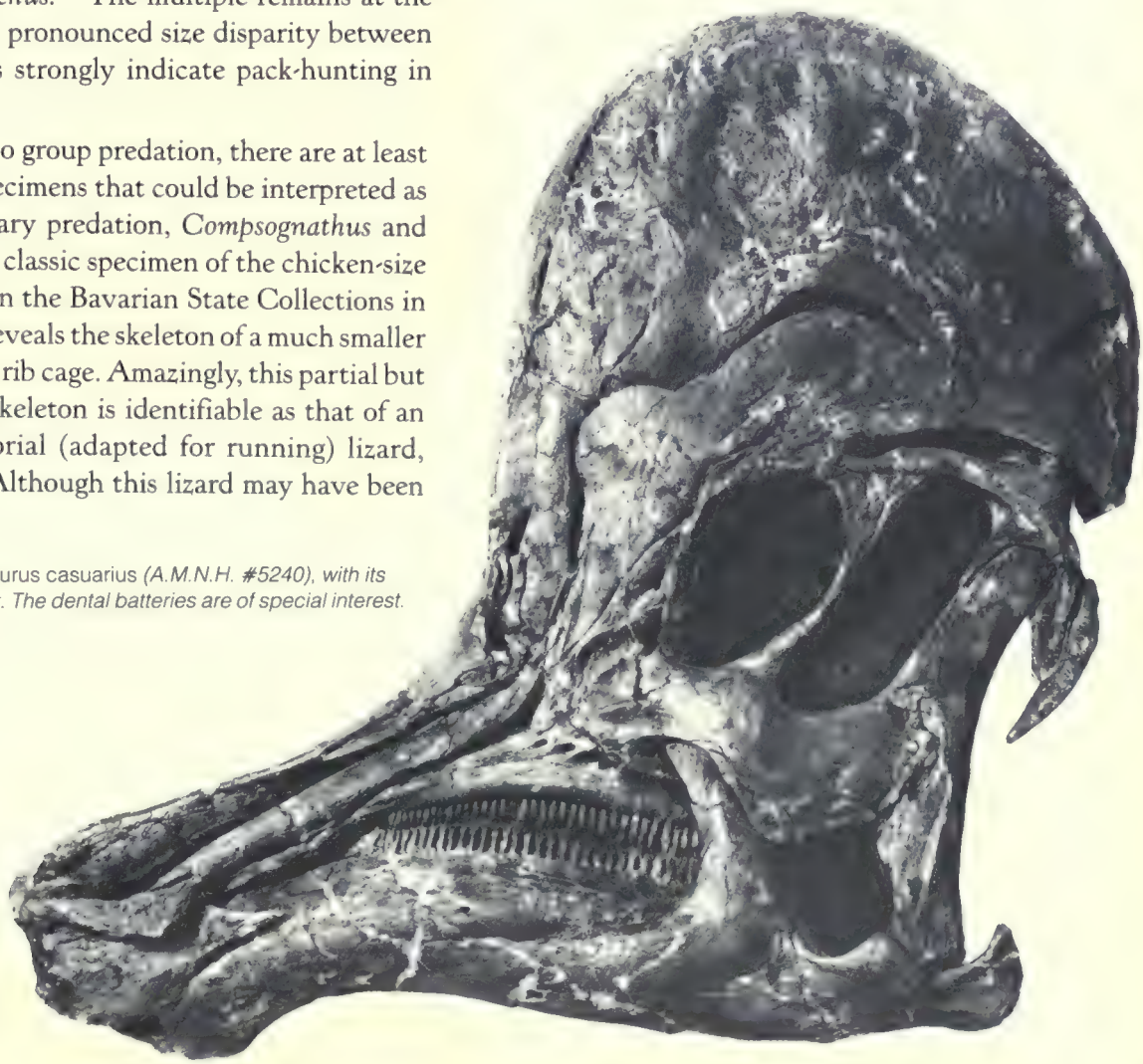
J.O. Farlow has speculated about the diet and foraging behavior of theropods, relying on analogies of Recent predators (crocodilians, the Komodo monitor, and several other lizards, mammals, and birds).[12] The actual fossil evidence, though, is sparse. Taphonomic evidence suggests that some theropods may have foraged in groups. For example, the famed *Coelophysis* Quarry at Ghost Ranch, New Mexico contained numerous skeletons of the small carnivore *Coelophysis*, but very little else. The few other species recovered there were also carnivorous types. By contrast, the Cleveland-Lloyd Quarry of Utah has produced vast numbers of bones of *Allosaurus* of all size classes associated with several kinds of herbivores. The *Allosaurus* remains greatly outnumbered bones of the herbivorous kinds (*Camptosaurus* and *Stegosaurus*). W.L. Stokes has explained the disproportionate abundance of carnivore remains in the Cleveland-Lloyd Quarry as a Rancho La Brea-type "predator trap," where *Allosaurus* was attracted in numbers to feed on mired-down dying or dead herbivores.[13] The *Coelophysis* Quarry, however, is not so easily explained. There, only carnivores are preserved and they are almost exclusively the remains of *Coelophysis*, at a ratio of about 30 to 1. The remains of *Coelophysis* include both young and adults and are preserved as articulated skeletons that are partial or complete. This suggests the expiration of a clan, perhaps at a drying-up water hole, but does preclude their demise by flood at a clan scavenging feast.

The taphonomic evidence is inconclusive.

While these two sites may appear ambiguous, there is persuasive evidence at another site that at least one kind of theropod, *Deinonychus*, probably hunted in packs. At the Yale *Deinonychus* Quarry in Montana, were recovered remains of at least four individuals of *Deinonychus* associated with fragments of a single much larger herbivore, *Tenontosaurus*.[14] The unabraded condition of the delicate *Deinonychus* remains argues that these were preserved at or very close to the site of death. A tempting conclusion is that these several 70-kg (154 lb.) predators were killed during an attack on the much larger prey animal (*ca.* 600-700 kg), *Tenontosaurus*. Isolated, presumably shed, teeth of *Deinonychus* have been found associated with a number of other *Tenontosaurus* skeletons, suggesting that this particular ornithopod was favorite prey for the much smaller *Deinonychus*.[15] The multiple remains at the Yale site and the pronounced size disparity between the two animals strongly indicate pack-hunting in *Deinonychus*.

In contrast to group predation, there are at least two theropod specimens that could be interpreted as evidence of solitary predation, *Compsognathus* and *Coelophysis*. The classic specimen of the chicken-size *Compsognathus* in the Bavarian State Collections in Munich clearly reveals the skeleton of a much smaller animal within its rib cage. Amazingly, this partial but still articulated skeleton is identifiable as that of an apparently cursorial (adapted for running) lizard, *Bavarisaurus*.[16] Although this lizard may have been flushed by group foraging, it obviously was caught and consumed by just one predator. (It appears to have caused fatal indigestion.) The evidence in *Coelophysis*, on the other hand, is not so clear. Within the body cavity of one adult skeleton is a mass of disarticulated small bones that appear to be those of a very young *Coelophysis*, although that is not certain. It is not even clear whether these belong to one individual or include parts of several. This could be a case of group cannibalism, or perhaps scavenging, with these consumed incomplete remains evidence of more than one consumer.

The only convincing evidence of solitary predation among dinosaurs is footprint evidence reported from Texas,[17] Queensland, Australia,[18] and possibly Colorado.[19] In these reports, the authors note the occurrence of one or two trackways of large theropods paralleling trackways of various herbivorous



The skull of Corythosaurus casuarius *(A.M.N.H. #5240), with its prominent nasal crest. The dental batteries are of special interest.*

dinosaurs. There is no way to establish whether these different trackways were made at the same time, but the fact that the predator trackway, in some instances, parallels a herbivore's trackway strongly suggests that one was stalking the other.

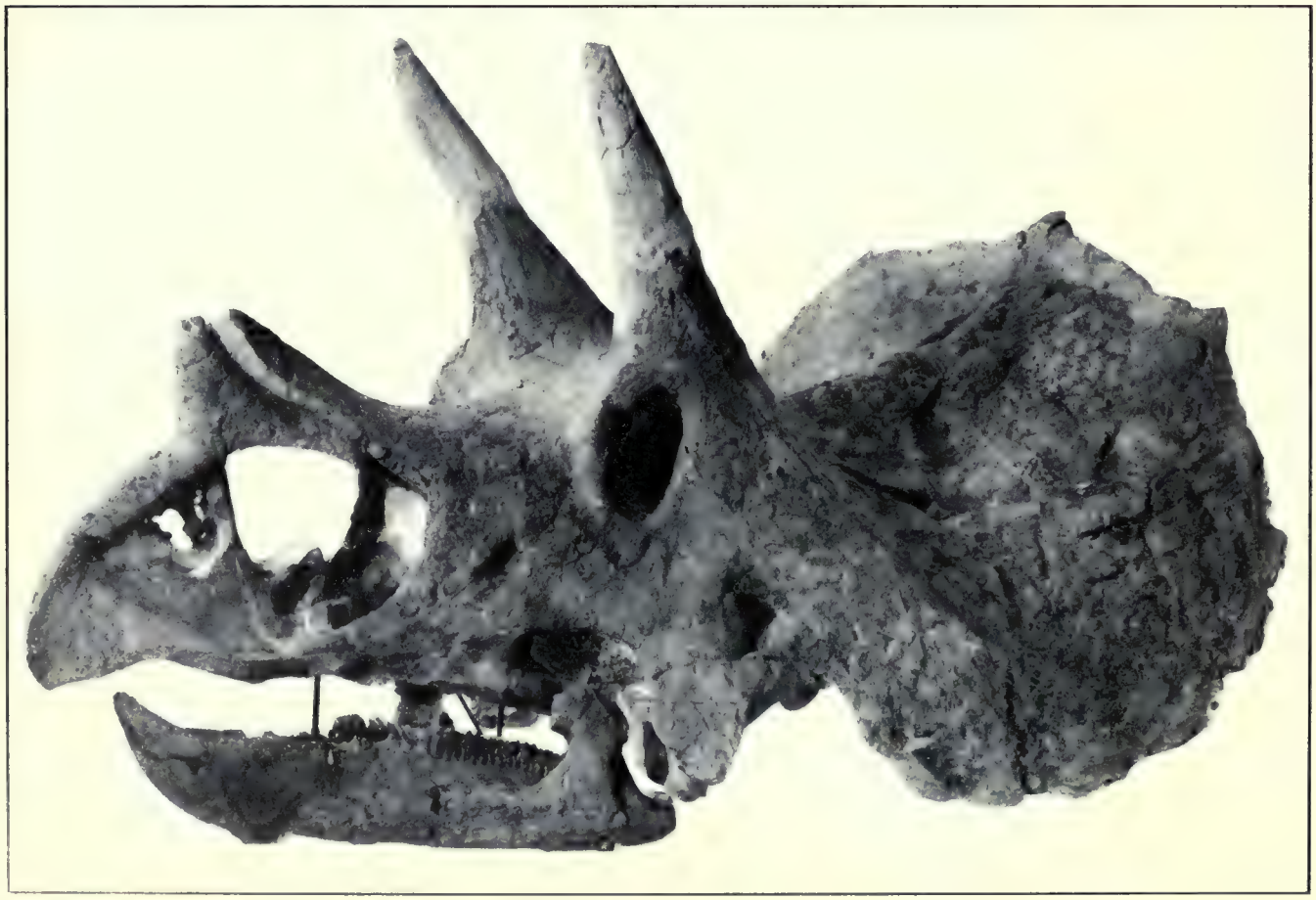
Concerning the killing tactics of the various theropods, there is very little evidence. But the bizarre anatomy of *Deinonychus* provides us with remarkable clues about a peculiarly aggressive predator. Hunting in packs, as noted earlier, these animals apparently grasped the prey with clawed forelimbs and slashed at vulnerable regions with large, sharp, sickle-like hind claws. This hypothesized tactic was confirmed by a remarkable discovery in Mongolia of a near relative of *Deinonychus*—*Velociraptor*.[20] It was preserved in fatal combat with its intended prey (*Protoceratops*), the lethal pedal claw imbedded in the midsection and the hands grasping the head of *Protoceratops*. To my knowledge, this is the only direct evidence available that clearly documents the method of kill by any theropod, and thus the only certifiable evidence of theropod predation, as opposed to scavenging.

Speculations abound concerning the feeding habits of giant theropods such as *Tyrannosaurus* and *Tarbosaurus*. Their sheer size alone, together with their miniscule and seemingly useless forelimbs, suggests a scavenging mode, but we don't know. Yet it is difficult to visualize a five-ton *Tyrannosaurus* succeeding in pursuit of any prey.

Mating Behavior

Not surprisingly, there is no evidence at all for most dinosaur kinds concerning mating behavior other than the obvious fact that all kinds did succeed in mating. Clutches of eggs of several varieties have been found, notably the Mongolian ceratopsian *Protoceratops*,[21] the French sauropod *Hypselosaurus*,[22] and most recently the duckbill *Maiasaura* from

The skull of Triceratops brevicornus *(B.S.P. Munich), illustrating the frill extension and facial horns. The dental batteries are also of special interest.*



Montana,[23] plus several other unidentifiable kinds.[24] John Horner's discoveries are among the most important and exciting dinosaur finds in decades. Not only has he recovered several different kinds of eggs in clutches, he has also found multiple nests of what appear to be the same kind in a single horizon, suggesting "colonial nesting." The same kind has also been found in different horizons. Horner interprets the latter as evidence of "site fidelity"—the gravid females returning to the same nesting site year after year.[25] Even more important is Horner's discovery of nests of very young duckbills apparently huddled together like bird hatchlings in a nest. But these young are too large to be very recent hatchlings. Moreover, their teeth show sign of wear. The question that cannot be answered: Did these young forage for food on their own and return to the shelter of their nest, or is there a suggestion here of parental care with the parents bringing food to the nestlings? Horner's discovery of this multi-species dinosaur nesting ground in Montana gives us a new window on dinosaurian biology.

The duckbill dinosaurs have prompted the most speculation about dinosaur mating or courting behavior, chiefly because of their peculiar nasal apparatus and the variety of cranial crests in some. J.A. Hopson presented a convincing hypothesis (first suggested by C. Wiman in 1931) that the cranial crests of certain hadrosaurs were visual cues and that the hollow crests containing loops of the nasal passages were vocal resonating structures—all of which presumably promoted successful intraspecies identification, thus serving as a premating genetic isolating mechanism.[26] He argued further that the large depressions enclosing the external nares in the crestless hadrosaurs housed "inflatable" diverticulae of the nasal passages that similarly served as display organs. Hadrosaurs had well developed eyes,[27] and ears[28]; enhanced olfaction[29] perhaps provided by the expanded nasal tracts, may also have played a role in hadrosaurian species recognition (or approaching predators), but D.B. Weishampel has reinforced the resonating hypothesis, arguing that vocalization in the hollow-crested duckbills was for parent-offspring communication, rather than mate signalling.[30] If one, why not both?

Turning to the horned dinosaurs, J.O. Farlow and P. Dodson pondered the variety of frill shapes and

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sizes together with variations in the nasal and brow horns.[31] They concluded that these differences in cranial morphology reflect differences in intraspecific agonistic and courtship behavior, somewhat analogous to behavior in modern horned ungulates and some horned lizards. The earliest ceratopsians featured short frills and only a single nasal horn, or none at all. Farlow and Dodson suggested that the frill served as a "visual dominance rank symbol" and that the nasal horn was used in intraspecific combat with the snout and horn being swung against the competitor's flanks. According to these authors, later ceratopsians had larger frills that enhanced the display function, and the more complex arrays of multiple facial horns were used in frontal combat with adversaries of their own kind. The possibility of a pair of rutting *Triceratops* bulls squaring off against each other to win potential mates or to achieve dominance of the group makes much more sense than the usual explanation of a threatened *Triceratops* fencing off a hungry *Tyrannosaurus*.

Rutting behavior seems to have been true of another group of dinosaurs, the bipedal pachycephalosaurs, or "dome heads." Members of this group of ornithopods are characterized by massively thickened bony skull caps. P.M. Galton has argued persuasively that this thickened bony dome was used in intraspecific contests in frontal head-butting analagous to that of American bighorn sheep.[32] Presumably, this activity was by rutting males in competition for mates or to establish dominance over the herd.

R.E. Molnar has given an interesting review of the analogies in modern ungulate mammals and the various ornithischian dinosaurs to test some of the above inferences about structure and inferred behavior.[33]

Defensive Behavior

Defensive strategy among dinosaurs undoubtedly was as varied as the size and appearance of the animals themselves. While the use of some structures seems obvious, the evidence is sometimes ambiguous. The horned dinosaurs, for instance: were their nasal and brow horns for active defense against predators, as frequently claimed, or were they for intraspecific sparring to establish dominance within the herd, as Farlow and Dodson maintained?[34] Among the armored dinosaurs, defense seems to have been chiefly passive, the animals being well shielded beneath thick bony scutes and spikes. Yet some, like *Ankylosaurus*, carried spikes or macelike clubs at the end of the tail, suggesting a more active mode of defense.

The large erect bony plates along the back of the *Stegosaurus* have long been interpreted as defensive structures which made the animal appear larger in profile. Recent examination by Farlow *et al* of the internal structure of these plates, combined with experimental studies, indicates that these bony structures probably served as thermal regulating devices rather than for protection.[35] They were highly vascularized and likely to have been heavily perfused with blood—probably to dissipate excess body heat. But *Stegosaurus* was also armed with large bony spikes at the end of the tail, suggesting an aggressive or active mode of defense.

Despite these apparently active defense adaptations, the predominant defensive behavior must have been by fleeing. Or perhaps safety in numbers was the dominant defensive strategy. Roland Bird reported and illustrated a most informative series of dinosaur trackways preserved in Early Cretaceous strata in Bandera County, Texas.[36] Here were parallel trackways of 23 sauropods all heading in the same direction or, as Bird remarked, "all were headed toward a common objective."Bird stated that these animals passed as a single herd. Except for von Huene's suggestion of migrating behavior in the prosauropod *Plateosaurus*, this is the first explicit statement known to me of group activity (social or otherwise) to be founded on substantial evidence.[37] In 1968, R.T. Bakker expanded on Bird's report, claiming that Bird's herd actually was a "structured" herd that included young as well as adult sauropods, with the young surrounded by the adults, as though for protection.[38] Bakker did not document his claim, though, and no one has yet re-analyzed Bird's trackways at Davenport Ranch. Despite these notices, the idea of group activity in dinosaurs has received little published attention until recently, possibly because few believed that any evidence could document this. In 1972, the idea came to life again, resurrrected by this author in a description of a long-known site in Massachusetts, where several dozen trackways are preserved. I will return to that evidence later. But the evidence at Davenport Ranch must be carefully

Map of Roland Bird's sauropod trackway field at Davenport Ranch, Texas. Of special interest is the mix of large and small footprints and the fact that they are all headed in approximately parallel traverses. Although it has been claimed (by R. T Bakker, 1968) that the small footprints occur only in the center of the "herd" and the large ones only on the periphery, that is not entirely evident even in the right-hand cluster, where large and small animals occurred together near the center. In the left-hand cluster the evidence of herd structure is even more ambiguous.

examined to test Bakker's interpretation of group defensive behavior in that passing herd.

It is obvious in living animals that flight from danger is the most common form of defense. To the best of my knowlege, there is only one clear paleontological example of this in dinosaurs: a footprint site in Queensland, Australia reported by Thulborn and Wade.[39] They describe a series of trackways recording a "stampede" of more than 150 bipedal dinosaurs, identified as both ornithopods and coelurosaurs, that ran at speeds of up to 16 km per hour. Associated with the stampede tracks is the trackway of a much larger theropod — an animal perhaps the size of *Tyrannosaurus*. Thulborn and Wade suggest that it was the presence of this large predator that triggered the flight of so many smaller animals—whose trackways are all closely parallel.

The 16 km-per-hour estimated speed of the fleeing Australian dinosaurs is not particularly impressive, but perhaps it was sufficient to avoid the grasp of the much larger and less fleet theropod that sent them running. More importantly, that is significantly faster than the velocities estimated by Alexander,[40] Tucker and Burchette,[41] Kool,[42] Mossman and Sarjeant,[43] and Currie,[44] using Alexander's formula on trackway data at various sites, all of which indicate slow walking speeds of usually less than 10 km per hour. Such evidence of slow speeds is not surprising, since animals walk much more than they run, and the probability of preservation of the trackway of a running ani-

mal is far less than that recording a casual stroll. Coombs,[45] on anatomical evidence, and Thulborn,[46] on anatomical and trackway evidence, have theorized about cursorial speeds and gaits in a variety of dinosaurs and conclude that maximum running speeds in dinosaurs ranged from 6 to 7 km per hour in ankylosaurs and stegosaurs to 43 km per hour in the ornithopod *Dryosaurus* and 56 km per hour in the coelurosaur *Gallimimus*. A recent report by Farlow of trackways at a site in Kimble County, Texas appears to substantiate their conclusions.[47] He documents trackways of three medium-size theropods that indicate velocities of nearly 30, 40, and 43 km per hour. While not as fleet as a race horse, here is good evidence that some dinosaurs, as we all suspected, were capable of respectable speeds of pursuit or escape.

Group Or Social Behavior

Although instances of multiple dinosaur remains have been reported from a number of sites (for example, the Cleveland-Lloyd Quarry of Utah, the Carnegie Quarry at Dinosaur National Monument, the Yale Quarry #1 at Garden Park, Colorado, and the famed *Brachiosaurus* Quarries in Tanzania), these contained a variety of dinosaur kinds and appear to be postmortem accumulations. There are, however, several mass assemblages that are intriguing because they are mono-specific. There is the mass burial of more than three dozen skeletons of the ornithopod *Iguanodon* recovered from a coal mine near Bernissart, Belgium in 1878,[48] as well as the several dozen or more individuals of the prosauropod *Plateosaurus* recovered at Trossingen, West Germany.[49] The *Coelophysis* Quarry of New Mexico may be another example, except that it is not quite mono-specific. The two European sites have long been tacitly accepted as evidence of group congregation in those two varieties of dinosaurs. Von Huene even ventured to explain the concentration of *Plateosaurus* skeletons at Trossingen as mass mortality of a herd during migration. Convincing as these several assemblages may seem, indicating that social congregation occurred in at least some dinosaur species, it is still possible that these concentrations resulted from factors *other* than social assembly.

However one chooses to assess those mass mortalities, the best evidence in support of gregarious habits among dinosaurs is found in the fossil footprint record — trace fossil data that have often been maligned. Many occurences of multiple dinosaur tracks have been reported from around the world, but with the exception of Bird, until recently, no inferences had been drawn about possible gregariousness from such footprints evidence.[50] Bird, as noted above, reported and illustrated a remarkable site on Davenport Ranch in Bandera County, Texas, that revealed trackways of several dozen sauropods with nearly parallel orientation. In 1968, as also noted above, Bakker went one step further, commenting that "these animals were not merely a disorganized mob of reptiles [which Bird had neither stated or implied], but rather they were socially arranged in what appears to have been a true herd. The very largest footprints were made only at the periphery of the herd; the very smallest were made only in the center of the herd." While there may be some truth to Bakker's structured herd interpretation of the Davenport Ranch evidence, that evidence is not as free of ambiguity as Bakker's statements assert. Bird's map of the Davenport site clearly shows that.

Structured or not, the herding behavior of dinosaurs was first shown and recognized by Bird at Davenport Ranch and substantiated by the remarkable record preserved at Holyoke, Massachusetts, which shows the traverses of 28 individuals, 20 of which are nearly parallel-trending in a generally westerly direction.[51] All of the nearly parallel trackways appear to have been made by the same kind of bipedal animal, to which the footprint name *Eubrontes* has been applied. Of the eight other trackways that do not parallel the group, half appear to have been made by a different kind of dinosaur. The conclusion seems inescapable: here is clear evidence of a herd of one species of dinosaur strolling together across the Connecticut Valley landscape.

Since the Holyoke site was reported, several similar records have been recognized and previously reported sites have been reexamined. These multiple records of near-parallel traverses by numerous individuals provide the most convincing evidence available that several kinds of dinosaurs did in fact congregate and move in groups. But there are some question marks. For example, a few sites record noticeably "symmetrical" traverses, with most track-

ways oriented in opposing directions with either NW or SE bearings. There is no evidence that any barriers existed confining those travelers to a "sidewalk" pathway, but that possibility cannot be ruled out. Yet, the number of trackway sites around the world that show preferred trackway orientation is surprising. We can only speculate on these intriguing sites and what they portray about social behavior and how structured dinosaurian community life may have been. FM

NOTES

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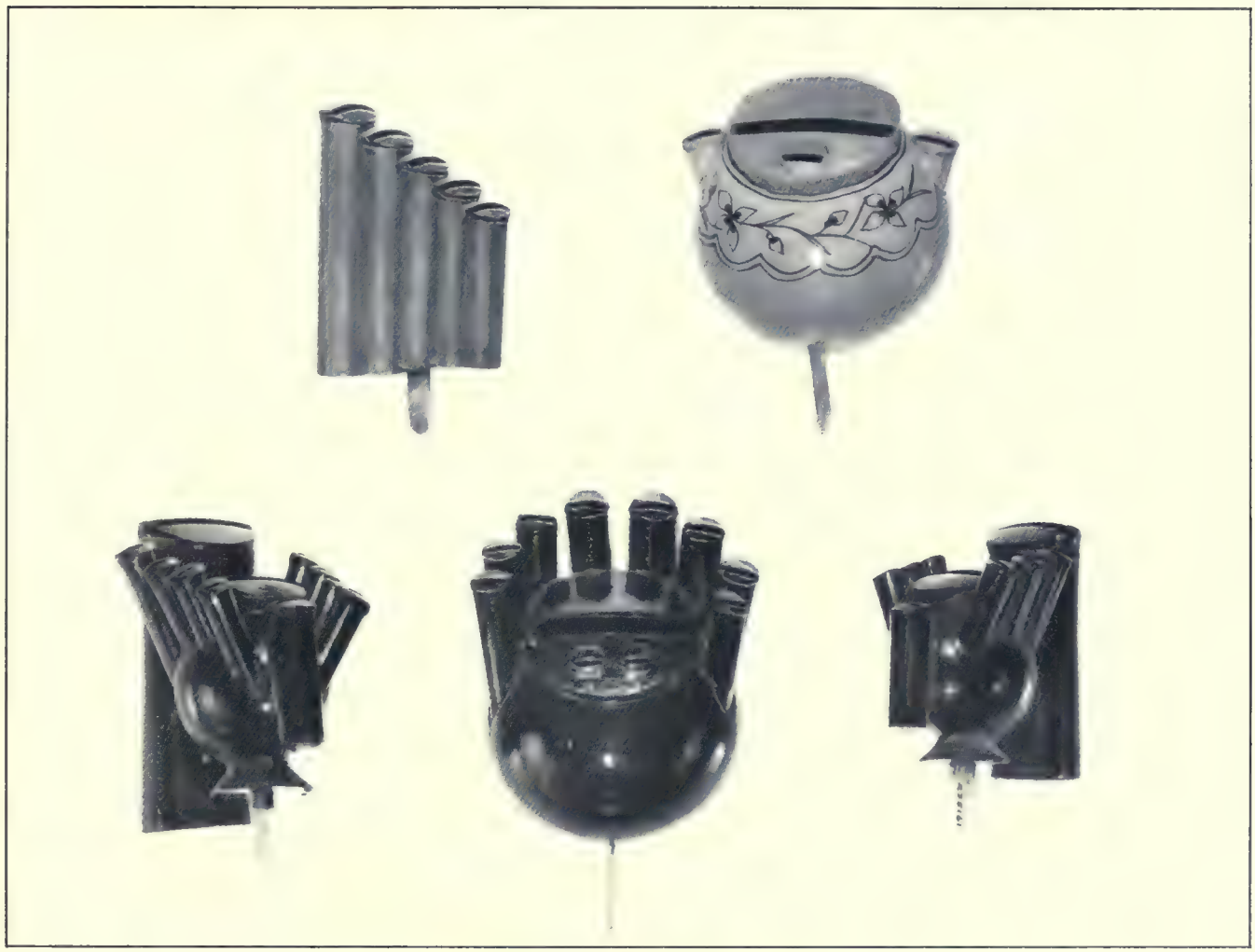
Pigeon Whistles

by Berthold Laufer

This article originally appeared in the September 1934 Field Museum News, *as the* Bulletin *was then called. The author, Berthold Laufer (1874-1934), then curator of the Department of Anthropology, was a world renowned authority on cultures of the Far East. The pigeon whistles he describes may be seen today in Hall 32.* —Ed.

The Chinese have trained carrier pigeons for more than a thousand years, but never on a large scale or intensively. However, they have added to the art of pigeon-training an attractive means of amusement. As they were the first who communed with the air by means of kites, they also were the first who created "music on the air," long before anyone ever dreamed of such a thing as radio. This was accomplished by means of whistles, extremely light in weight, attached to the pigeon's tail feathers. These whistles



Pigeon whistles on view in Hall 32

consist two, three, or five reed tubes of graded length in the shape of a Pandean pipe, varnished yellow, brown, or black; or of a small gourd into which reed pipes are inserted.

A complete collection of these whistles, some engraved with the names of the makers, is on view in a case illustrating the musical instruments of China in Hall 32 on the West Gallery.

The whistles are fastened to the tail feathers of the birds while they are still young. Then a flock of pigeons flies up, the wind strikes the apertures of the instruments, sets them to vibrating, and produces a not unpleasing open-air concert the charms of which are heightened by the fact that the whistles used in the same flock are tuned differently.

The Chinese explain that the sounds of the whistles are intended to keep the flocks together, and to protect the birds from onslaughts of hawks and other birds of prey. This rationalistic interpretation, however, is not convincing. It is not known, and seems at least doubtful, whether such music makes an impression on either pigeon or hawk, and whether it would really prevent famished pirates of the air from making a swoop at their quarry. Even supposing that this might happen once in a while, we must consider that this music constantly fills the atmosphere year by year, and the unrelenting foes of the pigeon would gradually become accustomed to it and disregard it.

It seems more plausible that this quaint custom has no rational origin, but is rather the outcome of purely emotional and artistic tendencies. It is not the pigeon that profits from the aerial music, but the human ear that feasts on the wind-blown tunes and derives esthetic enjoyment from them. On a serene day one can hear this concert in Peking all day even in one's house. The pigeons which fly about with whistles attached to them are termed poetically "mid-sky beauties."

Planned Giving Program Enhances Museum's Endowment

Both Planned Giving and Year-End Giving Work to the Donor's Benefit, Too.

By Clifford Buzard
Planned Giving Officer

Three years ago this fall, Field Museum launched its Planned Giving Program as a division within the Office of Development that would devote its energies to building up the Museum's endowment funds through bequests and other types of "deferred" gifts such as charitable remainder life income trusts.

When starting the program, the Museum knew of 36 Members who had remembered the Museum in their wills. Today, the Museum has been informed of 110 such "bequest expectancies." Further, the Museum now has an active Pooled Income Fund for donors that has approximately $250,000 in assets; it also knows of several charitable remainder annuity trusts that total $800,000—all assets that eventually will go into the Museum's endowment funds.

Only this past January, a charitable annuity trust with a principal of $250,000 was successfully negotiated and executed between the Planned Giving Office and a donor. The donor received an immediate income tax deduction (with the five-year roll-over privilege) and now receives a quarterly income from the trust for life. Bequests can take many forms, and charitable life income trusts can take various forms.

The idea of "planned giving," however, has put a different perspective on the entire field of philanthropy, in that through it, many persons have discovered the fact that there are numerous ways to give to the Museum in forms other than cash, and that these other forms often can be to their better

[illegible] this October issue of the *Bulletin*, it is not too early to begin planning a year-end-giving program, in order to get the highest possible benefits of income tax deductions for 1984. While it is true that year-end gifts most often are in the form of cash, because they are unplanned, impulse gifts, consider the number of other possibilities for ways of giving, some of which can be substantial, and very much to the donor's benefit.

Gifts of Stock

Over the years, many friends of the Museum have found it to their advantage to give stock and other securities to the Museum instead of cash. One reason for this is that in the proper circumstances the tax laws may make it less costly to give stock or securities than an equivalent amount of cash. One's own particular situation will determine whether this applies. But, here's how it works:

1. Giving stock that has increased in value: When you sell a security that has increased in value, there is a capital gains tax to pay, even if all the proceeds are given to Field Museum. On the other hand, you can give the appreciated securities themselves to the Museum, and take a charitable deduction for the total value, including the appreciation, without recognizing any capital gain for tax purposes.

2. Giving only the appreciation: The "bargain sale." Sometimes a person wishes to retain his original investment, but wants to give his "gain" to the Museum. Such a person can sell the stock to the Museum at its original cost; the person is, in effect,

making a gift of the capital gain and retaining his original investment. A person doing this does incur a partial capital gains tax, and should be well advised by an accoutant or tax attorney.

3. Giving stock that has decreased in value. It is not always better to give securities to the Museum; sometimes it is better to sell the security and make a gift of the proceeds. If a person owns a "poor performer" (a stock that has gone down in value) and wants to eliminate it from his portfolio and make a gift to the Museum as well, that person should sell the stock and give the proceeds to the Museum. By doing that, a claim for a charitable deduction for the total amount of the proceeds and a claim for a capital loss can be made on the tax return at the same time—a kind of "double deduction."

A donor interested in giving stock as a year-end gift should contact the Development Office; and, in all cases, particularly the "bargain sale" situation, he should check first with his accountant or financial adviser.

Gifts of Real Estate

Most any type of real estate can be a fine and advantageous form of charitable gift: a building, an interest in a building, a farm, summer cottage, or one's own home. A person can make arrangements to give his home and retain a life interest in it; that is, although giving the home, he can live in it, rent-free, for life (although he would be responsible for upkeep and any property assessments or taxes), yet take an immediate income tax deduction.

Gifts of Life Insurance

Many persons are unaware that under today's federal estate tax law, life insurance policies, while they do not have to go through probate, are counted into the gross amount of the estate for estate tax purposes. Many persons let life insurance policies lie fallow long past the early years of their family when such protection was more greatly needed.

You can remove life insurance from your taxable estate by giving the policy to Field Museum or naming Field Museum as the beneficiary.

Besides the advantage of removing the face value from your estate, by giving the policy to the Museum now, you can receive an immediate income tax deduction for the cash surrender value.

Even if you are still paying premiums, if you assign the policy to Field Museum irrevocably, you may deduct from your income tax the annual premiums you pay each year as well as the cash surrender value.

Field Museum urges Members also to consider naming the Museum as contingent beneficiary on their life insurance policies. Field Museum also appreciates being named the contingent beneficiary to pension plans and to individual retirement accounts (IRAs).

Gifts-in-Kind: Other Property

Any asset, anything a person owns, can be considered "giveable." Some items, not usually thought of in terms of charitable gifts, however, can make valuable gifts to Field Museum: automobiles, trucks, boats, furniture, art, jewelry, antiques, artifacts, and collections of stamps, coins, or gems, to mention only a few possibilities. Often Field Museum is the recipient of valuable additions to its Library through gifts of rare books on various aspects of natural history. The tax deductions on gifts-in-kind can be tricky; for example, the tax laws make distinctions between a gift "to" an institution and a gift "for the use of" an institution. Therefore, a person wanting to make such a gift should seek advice from his attorney or tax consultant.

Giving Gifts for Income

Giving gifts that return a life income to the donor take the form of trusts. Basically, there are three forms of life income trusts: the Pooled Income Fund, the Charitable Remainder Unitrust, and the Charitable Remainder Annuity Trust.

A great beauty of these forms of life income trusts is that a person can make a substantial and very self-satisfying gift during lifetime, yet retain the security of a life income from that gift.

Charitable life income trusts also unlock and free up capital gains, on which the donor can still receive income. But, being part of the gift, just as in a outright gift of stock, the capital gain is not recognized and, therefore, is not taxable.

Charitable life income trusts also provide pro-

fessional money management. This is often the very great advantage of setting up such a trust in a will: it protects the spendthrift heir from himself or herself; it can also can protect an heir from cunning relatives and unscrupulous businessmen.

The two major types of charitable remainder trusts are the annuity trust and the unitrust. An annuity trust pays the donor/beneficiary a fixed dollar amount quarterly; the unitrust pays out quarterly a fixed percentage of the fair market value of the trust, based on an annual evaluation. By law, neither trust can pay out less than 5 percent. The annuity trust is a fixed instrument, in that principal cannot be added to it; the principal of a unitrust may be added to at any time.

The Pooled Income Fund pays to a donor/beneficiary only the income of his share of the Fund. A person may participate with a minimum gift of $10,000, and he may add to it in $1,000 increments at any time. At the time of the gift, the value is translated into numbers of "units" in the Fund. Payments are made on a pro-rata basis of the number of "units" in the Fund in which he has an interest.

The Pooled Income Fund is inclined to grow, since only income is paid out; capital gains are reinvested for the Fund. Conceivably, the donor/beneficiary could continue receiving a higher income. While the annuity trust payout is a fixed dollar amount, the payout of both the Pooled Income Fund and the unitrust can vary, up or down; but, generally, the two types of trust arrangements are considered to be hedges against inflation.

In all such life income trusts, at the death of the donor/beneficiary, what is left in the trust — the "remainder"—reverts to the Museum and its Endowment Fund. On the death of the donor/beneficiary in a Pooled Income Fund, only the underlying principal representing that person's income interest reverts to the Museum; the Pooled Income Fund continues to provide income for the surviving donors/beneficiaries.

Members interested in either of these forms of trusts should consult with the Field Museum's Planned Giving Office and their own attorneys. Working with the attorney, the Planned Giving Office will be happy to help by providing suggested forms to follow.

Gifts By Bequest

Just as there are several forms of life income trusts, there are many ways in which a person can give to the Museum by will. He can make a general bequest of a specific dollar amount or percentage of his estate; he can give a specific bequest, such as a collection, article, or artifact; or he can give real estate through a bequest. A person can also set up any of the forms of life income trusts for the benefit of a heir, with the residual going to the Museum's endowment fund upon the heir's death. There are several other technical types of bequests that are possible. Any interested Member is welcome to call the Planned Giving Office for information, (312) 322-8858, and ask for a copy of a brochure on "How to Remember Field Museum in Your Will."

Tax Deductions for 1984

Even persons who use the "short form" of income tax return can now take deductions for charitable gifts. For 1984, a person not itemizing may deduct 25 percent of the first $300 of a gift, deducting up to a maximum of $75. Persons itemizing their tax returns may deduct up to 50 percent of their adjusted gross income, if giving cash; up to 30 percent of their adjusted gross income if giving appreciated stock or other appreciated property such as real estate or gifts-in-kind. In all cases, if the gift exceeds the maximum percentage allowed, the person has a five-year carryover privilege; in other words, he may deduct amounts of that gift each year for five years that he has not already deducted — actually a total of six years to take the deduction. By all means, a donor to the Museum should consult with his tax accountant or attorney, for neither the Museum nor its employees can give legal advice nor guarantee its accuracy and currency.

Regardless of tax deductions, the greatest benefit from giving to the Museum is the self-satisfaction of having helped a great institution. The Museum began its "count-down" to its 1993 centennial this year, and all gifts—immediate or deferred—will be appreciated all the more, as every little bit will help ensure the future of Field Museum for the people of the Museum's second century.

TOURS FOR MEMBERS

Sailing the Lesser Antilles Aboard the Tall Ship *Sea Cloud*

February 7-16, 1985

Our itinerary offers a superb sampling of the Caribbean's best—Antigua, St. Barts, Saba, Martinique, and Iles des Saints. With the professional leadership of Dr. Robert K. Johnson, a Field Museum marine biologist, you will see and experience a great deal more than the conventional sightseer. Dr. Johnson is a topnotch tour lecturer, and your trip will be greatly enhanced by stimulating lectures and field trips. Price range (contingent on cabin selection): $3,455-$5,755. per person (includes round-trip air fare from Chicago, hotel accommodations in St. John's, Antigua, and full board while on the *Sea Cloud*).

The largest private ship ever built, the steel-hulled *Sea Cloud* is 316 feet in length and has four Diesel engines with total power of 6,000 B.H.P. The ship accommodates 75 guests in air-conditioned staterooms, each with two beds. The cuisine is in the best tradition of the great yachts of the past. Expert European chefs provide exquisitely prepared meals accompanied by vintage wines. A crew of 40 German officers and men, plus 20 cadets sail the *Sea Cloud*. There is ample deck space for sunning and enjoying the spectacle of the sails. Life aboard is informal and relaxed, and cruise participants may join in the operation of the sails.

Archaeological Tour of Egypt Including 5-day Nile Cruise

February 15-March 4, 1985

An unforgettable in-depth visit to the Land of the Pharoahs, including a 5-day Nile cruise aboard the luxurious *Hilton Steamer*. An Egyptologist will accompany the tour throughout, including the Nile cruise, and personally conduct all lectures and sightseeing. Tour highlights will include the pyramids and Sphinx of Giza, little-visited monuments of Middle Egypt, King Tut's tomb, the holiday resort of Aswan, and a visit to Abu Simbel.

Additional Tour Highlights for 1985

Galapagos Islands. China and Tibet. Alaska and Pribilof Islands.

Colonial South

April 13-20, 1985

Now you can be among the first passengers to visit the legendary Colonial South in the comfort of a relaxing, yacht-like cruise ship, with a friendly American staff to serve you. Our ports of call will be Savannah and St. Simon Island, Georgia; Beaufort, Charleston, and Hilton Head Island, South Carolina; with disembarkation at Savannah.

Dr. Lorin I. Nevling, director of Field Museum and a distinguished botanist, will accompany the tour, sharing his professional expertise on the flora of the exquisite gardens we'll visit. Our tour is planned to coincide with the spring explosion of color in daffodils, tulips, dogwoods, and azaleas—a welcome treat after Chicago's long winter. Local historians will provide us with talks on historic buildings of the region and on Civil War history. The *Nantucket Clipper* will cruise through the peaceful waters of the intra-coastal waterways, allowing you to spend each evening in town enjoying the port experience to its fullest, and affording even greater variety in this delightful cruise experience.

For further information or to be placed on our mailing list, call or write Dorothy Roder, Tours Manager, Field Museum, Roosevelt Rd. at Lake Shore Dr., Chicago, IL 60605. Phone: 322-8862.

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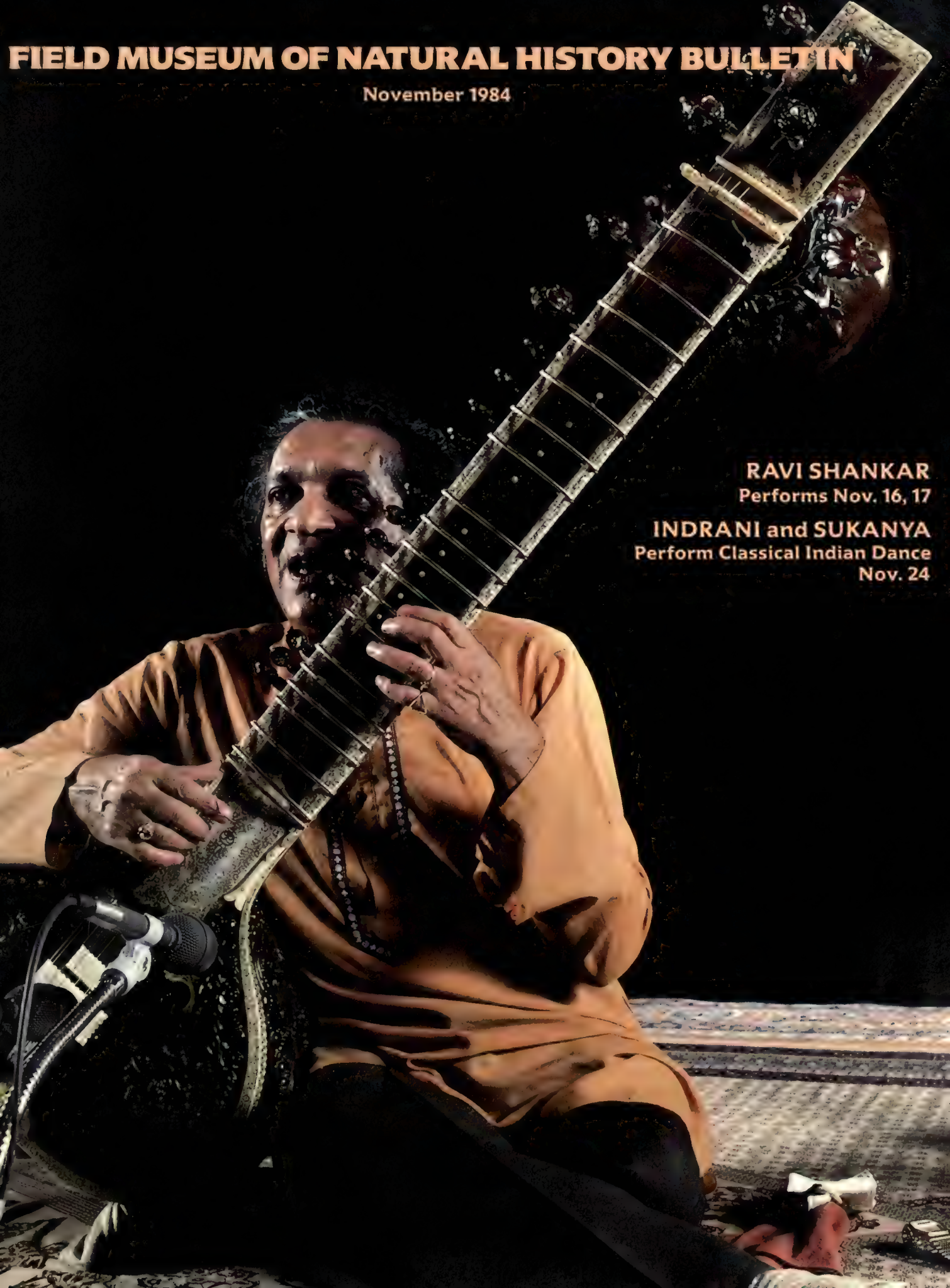
November 1984



RAVI SHANKAR
Performs Nov. 16, 17

INDRANI and SUKANYA
Perform Classical Indian Dance
Nov. 24

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CONTENTS

November 1984
Volume 55, Number 10

November Events at Field Museum 3

December Events at Field Museum 5

Adult Education Update 7
by Robert B. Pickering, program developer, Department of Education

On the Trail of the Finest Metallurgy of the Ancient New World: How Old Is the Classic Quimbaya Style? 10
by Donald W. Lathrap, John S. Isaacson, and Colin McEwan

My Life, My Music 20
by Ravi Shankar

The Right Gift at the Right Time: Jack C. Staehle Makes a Difference 24
by Glenn Paré, grants officer, Planning and Development

Field Museum Tours 27

COVER

World renowned Indian composer-musician Ravi Shankar performs at Field Museum with Alla Rakha, Nov. 16, 17. Photo by Steven E. Gross.

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A special invitation for Museum Members to

A FAMILY CHRISTMAS TEA AT FIELD MUSEUM

Thursday, December 13

A FAMILY CHRISTMAS TEA AT FIELD MUSEUM

Thursday, December 13, 1984
5:00 to 7:00 p.m.

The Junior League "Mad Hatters"
On Stage Chicago

The Westminster Bellringers
Village Presbyterian Church of Northbrook

Wizzo the Magician and Cooky the Clown
Chicago Public Library Storybook Characters in Person
Museum Games and Activities for Children
Santa Claus
The Stu Hirsh Orchestra

An Assortment of Christmas Treats
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Illustration from *St. Nicholas*. December. 1906.
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Events

Classical Arts of India: A Renaissance

Renaissance and Tradition in Dance and Music

Saturday, Nov. 10, 2:00pm, James Simpson Theatre
Dr. Joan L. Erdman
South Asia Language and Area Center
University of Chicago

The discovery and rebirth of Indian classical performing arts began in the early 20th century, when Ted Shawn and Ruth St. Denis brought Indian themes into their dances. In the early 1930s famed ballerina Anna Pavlova brought dancer Uday Shankar to the public stage. It was Uday's younger brother, Ravi, who became the bearer of India's performing arts tradition. Dr. Joan Erdman discusses these major artists and their work.
This lecture is free with Museum admission; no tickets required.

Ravi Shankar

Friday, Nov. 16, 8:00pm
Saturday, Nov. 17, 2:00pm
James Simpson Theatre

Performing on the sitar: Ravi Shankar; on the tabla: special guest Alla Rakha

Ravi Shankar is a singular phenomenon in the classical music world of the East and West. His impact on American music in the last decade has been more profound than that of any other non-Western musician. As a composer, Ravi Shankar has written extensively for ballet, film, and the concert hall in the United States, Canada, Europe, and India. His poignantly moving score for Satyajit Ray's celebrated film trilogy, *Pather Panchali, Aparajito* and *The World of Apu*, raised film music to a new standard of excellence. The score for the film *Gandhi*, which premiered in 1983, has won him critical acclaim. He is a figure much beloved of young people throughout the world today, just as he was to the generation of the 1960s who sustained their hope for world peace through the inspiration of his music.

India's great master of sitar and his brilliant associate on the tabla, Alla Rakha, join together for two stunning performances of their country's musical heritage.

Tickets: $12.00 (Members: $10.00). Fees are nonrefundable.

Indian dancer Indrani performs with daughter Sukanya in James Simpson Theatre, Sunday, November 24

Classical Dance of India with Indrani and Sukanya

Saturday, Nov. 24, 2:00pm, James Simpson Theatre

Indrani and Sukanya have delighted international audiences with their performance of Indian classical dance. Indrani, one of India's most distinguished and vibrant dancers, is the daughter of the famous dancer Ragini Devi, who pioneered India's dance revival. Sukanya, the daughter of Indrani, carries on her family tradition of dancing. She dances with a wonderful suppleness and joy—at one moment flinging her flexed feet out with abandon, at the next, assuming the tight-lipped expression of the God Rama.

Indrani and Sukanya perform classical dances based on traditions 3,000 years old. Dance has always been an important part of religious ceremonies in India. Body movement, symbolic hand gestures, and mime accompany incantations and songs. Drawn from the great Indian epics *Ramayana* and *Mahabharata*, these dances are essentially love songs to the gods. Together, Indrani and Sukanya have done much to captivate American audiences with the beauty and refined sensuousness of classical dance. Their subtlety of expression and arresting movements make this performance an unforgettable introduction to Indian dance.

Tickets: $8.00 (Members: $6.00). Fees are nonrefundable.

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CONTINUED from p. 3

November Weekend Programs

Each Saturday and Sunday you are invited to explore the world of natural history at Field Museum. Free tours, demonstrations, and films related to ongoing exhibits at the Museum are designed for families and adults. Listed are only a few of the numerous activities available each weekend. Check the *Weekend Passport* upon arrival for the complete schedule and program locations. The programs are partially supported by a grant from the Illinois Arts Council.

November

3 11:30 am *Ancient Egypt* (tour). Investigate the traditions of ancient Egyptian civilization from everyday life to mummification and the promise of an afterlife.

4 1:00 pm *Welcome to the Field* (tour). Enjoy a sampling of our most significant exhibits as you explore the scope of Field Museum.

11 1:00 pm *Red Land/Black Land* (tour). Tour the Egyptian exhibit, focusing on the geography of the Nile Valley and the effect it had on Egypt.

24 12:00 noon. *Traditional China* (tour). Examine the timeless imagery and superb craftsmanship represented by Chinese masterworks in our permanent collection.

25 1:00 pm *Ancient Egyptians* (tour). Explore artifacts from predynastic times to Cleopatra, focusing on the lives of the pharaohs and the Egyptian people.

Family Feature

Egypt Festival

Sunday, Nov. 25, 11:00am–4:00pm

The civilization of ancient Egypt was in its glory 5,000 years ago. Field Museum's Egypt Festival explores this extraordinary culture. Find out about the latest archaeological discoveries by touring our Egyptian Hall. Watch demonstrations of papyrus making. Enjoy the film classic *The Mummy* and laugh at the old myths of the cursed tombs.

Family features are free with Museum admission; no tickets required.

Registration

Please complete all requested information on the application. If your request is received less than one week before program, tickets will be held in your name at West Entrance box office. Please make checks payable to Field Museum. Tickets will be mailed on receipt of check. Refunds will be made only if program is sold out.

Program	Number of Tickets Requested	Amount Enclosed
Ravi Shankar, Nov. 16, 8:00 pm		
Ravi Shankar, Nov. 17, 2:00 pm		
Classical Indian Dance: Indrani and Sukanya		

Please check appropriate box: Member: ☐ Nonmember: ☐ Total

American Express/Visa/MasterCard number: _____

Name _____

Street _____

City _____ State _____ Zip _____

Telephone _____ Daytime _____ Evening _____

Signature _____ Expiration date _____

For Office Use:

Date Received _____ **Date Returned** _____

Return complete ticket application with a self-addressed stamped envelope to:

Public Programs: Department of Education
Field Museum of Natural History
Roosevelt Road at Lake Shore Drive
Chicago, IL 60605-2497

Have you enclosed your **self-addressed stamped envelope?**

Seventh Annual Anthropology Film Festival

Field Museum, West Entrance

Saturday, Dec. 1, 10:00 am–5:00 pm
Sunday, Dec. 2, 10:00 am–5:00 pm

A special invitation to explore the rich diversity of world culture on film. This year's festival consists of more than 50 films grouped into seven subject areas—The Film Fare of Les Blank, The Aboriginal Film Studies of David and Judith MacDougall, Northwest Coast Indians and Eskimos, Central and South America—The Past Ten Years, The Caribbean: Dreams and Realities, Back in the U.S.A., and Through Native American Eyes.

On Saturday, filmmaker Les Blank introduces his latest release, "In Heaven There Is No Beer." This, as with other Blank films—"Always For Pleasure" and "God Respects Us When We Work—But He Loves Us When We Dance," conveys the imperative of life over death and a recognition that pleasure is a human necessity.

On Sunday, the recent works of David and Judith MacDougall are featured. The Australian Institute for Aboriginal Studies was established 20 years ago. Its purpose has been to create enduring records of the ways that different groups of aboriginal people live, think, and act in this important period of their history. A selection of these film include "Takeover," "A Walbiri Fire Ceremony: Ngatjakula," and the newly released "Stockman's Strategy" and "Collum Calling Canberra."

Additional festival highlights include "Dream of a Free Country: A Message from Nicaraguan Women" and "I'd Rather Be Pow Wowing," a story of a Northern Plains Indian whose life in the modern world has not kept him away from his origins in the Native American world. A special series of Northwest Coast Indian films document these people from the first footage shot by Edward F. Curtis to the recent cultural and artistic renaissance.

Films are screened by subject area in three theatres located at the West Entrance of Field Museum—James Simpson Theatre, Lecture Hall One, and Lecture Hall Two. Tickets may be purchased for a single-day screening or the two-day series. The festival schedule is subject to change. A final film schedule and complete film descriptions are available on the days of the festival. Call (312) 322-8854 for details.

Tickets: *One day: $7.00 (Members: $6.00)*
Series: $12.00 (Members: $10.00)

Animal Antics

Through stories, films, cartoons, and a play, parents and children can discover how a multitude of creatures live in the wild and in the world of fantasy. These programs are free with Museum admission; tickets not required.

Animal Stories

Saturdays and Sundays, Dec. 8, 15, 16, 22, and 23, at 11:00am
Hall 17, Asian Animals

How did the leopard get his spots? Why does the camel have a hump? How did the elephant get a trunk? Storytellers relate some of these famous animal tales for the delight of young and old.

The Rabbit Who Wished for Red Wings
The National Marionette Company

Saturday and Sunday, Dec. 29 and 30; 2:00 pm
Stanley Field Hall

With a flick of his wrist and a gentle wave of the hand, puppeteer Ralph Kipness controls the taut strings that bring life to a delightful cast of animal creatures. Little Rabbit is always wishing for things. When his wishes start to come true, he is, at first, elated. All too soon, he is in for a big surprise. Join us at the "Story Shop" as this southern folk tale, written by Carol Cerwin Baily, unfolds.

"Polar Potluck"—a participatory play

Saturdays, Dec. 8 and 15, at 1:00pm
Hall 18

Your family is cordially invited to a farewell party for Karl and Katy Caribou, who are getting ready to migrate south. Pandora Polar Bear, Samantha Seal, and Walter Walrus are planning a big party to send them on their way. Participate in this play about arctic animals and bid the Caribou *bon voyage*!

Animals on Film: Fantasy and Fact

Saturdays, Dec. 8, 15, & 22; 2:00–4:00pm
Hall 18

December 8	"Donald Duck" selected cartoons "Konrad Lorenz: Science of Animal Behavior," "Wings of an Eagle"
December 15	"Chilly Willy" selected cartoons "White Wilderness"
December 22	"Sylvester" and "Felix the Cat" selected cartoons, "Born Free"

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CONTINUED from p. 5

December Weekend Programs

Each Saturday and Sunday you are invited to explore the world of natural history at Field Museum. Free tours, demonstrations, and films related to ongoing exhibits at the Museum are designed for families and adults. Listed are only a few of the numerous activities available each weekend. Check the *Weekend Passport* upon arrival for the complete schedule and program locations. The programs are partially supported by a grant from the Illinois Arts Council.

December

2 12:30 pm *Museum Safari* (tour). Seek out shrunken heads from the Amazon, mummies from ancient Egypt, and big game from Africa.

8 12:00 noon *Continents Adrift* (lecture). Why have fossils of similar dinosaur species been found on continents separated by vast oceans? The concept of "moving" continents is illustrated with enormous puzzle pieces.

1:30 pm *Tibet Today* (slide lecture). See Lhasa and other cities now open to tourists.

2:45 pm *A Faith in Exile: Darjeeling, Sikkim, Dharamasla (Home of the Dalai Lama)* (slide lecture). Focus upon Tibetan refugees in India.

3:45 pm *Bhutan* (slide lecture). Explore the land of the Thunder Dragon.

15 1:00 pm *Red Land/Black Land* (tour). Tour the Egyptian exhibit focusing on the geography of the Nile Valley and the effect it had on Egypt.

16 12:30 pm *Museum Safari* (tour). Seek out shrunken heads from the Amazon, mummies from ancient Egypt, and big game from Africa.

1:00 pm *Welcome to the Field* (tour). Enjoy a sampling of our most significant exhibits as you explore the scope of Field Museum.

29 1:30 pm *Ancient Egyptians* (tour). Explore artifacts from Predynastic times to Cleopatra, focusing on the lives of the pharaohs and the Egyptian people.

Family Feature

Active Animals

Thursday and Friday, Dec. 27, 28; 1:00–3:00 pm
Stanley Field Hall, Main Floor

Some animals run, others crawl. Some animals fly, and others swim. How would the animal of your dreams move? Design an animal of your own, based on fact or fantasy, and make it do what you want it to . . . roll, hop, slither, or fly.

Family features are free with museum admission and no tickets are required.

Registration

Please complete coupon for your program selection and any other special events. Complete all requested information on the application and include section number where appropriate. If your request is received less than one week before program, tickets will be held in your name at West Entrance box office until one-half hour before event: Please make checks payable to Field Museum. Tickets will be mailed on receipt of check. Refunds will be made only if program is sold out.

Seventh Annual Anthropology Film Festival	Member Tickets # Requested	Nonmember Tickets # Requested	Total Tickets # Requested	Amount Enclosed
Saturday & Sunday Series				
Saturday only				
Sunday only				
			Total:	

Please check appropriate box: Member: ☐ Nonmember: ☐

American Express Visa MasterCard number: _____

Name _____

Street _____

City _____ State _____ Zip _____

Telephone _____ Daytime _____ Evening _____

Signature _____ Expiration date _____

For Office Use:

Date Received **Date Returned**

Have you enclosed your **self-addressed stamped envelope?**

Return complete ticket application with a self-addressed stamped envelope to:

Public Programs: Department of Education
Field Museum of Natural History
Roosevelt Road at Lake Shore Drive
Chicago, IL 60605-2497

In the "Textile Conservation" course, workmanship of a fine old quilt (ca. 1870) is examined and methods for preserving its beauty are discussed.

Adult Education Update

by Robert B. Pickering
Program Developer, Department of Education

photos by the author

The March 1984 *Bulletin* included an article on Field Museum's Adult Course program together with a questionnaire requesting comments from readers about the program. Returned questionnaires have been tabulated and analyzed, and some changes are being made in the program as the result of the suggestions. Many of those who responded had complimentary things to say about the program and appreciated the variety and quality of the courses offered. People also told us why they do or do not take courses at Field Museum.

Two-thirds of the people responding were enrolled in or had taken courses at Field Museum. Almost 75 percent have taken courses at other institutions in or around Chicago. Field Museum members are an education-oriented group and have an interest in a wide variety of subjects, from Egyptian hieroglyphics to real estate to dog training. Over 55 other Chicago-area institutions were mentioned as offering courses taken by members. Institutions in the greater Chicago area offer a vast assortment of opportunities for adult continuing educa-

A student in "The Art of Papermaking" uses a portable press to remove excess water from a sheet of paper that he has just made.

tion experiences, providing thereby tremendous competition for Field Museum's own program. Competition puts pressure on our program to continually improve the quality of the courses and make them more appealing.

The many complimentary statements about the course program are appreciated, but the comments of those who do not take courses at Field Museum also provided valuable insights into how our program could be improved. For example, 45 percent reported that 7:00–9:00pm was an inconvenient time to attend courses. As a result of this response, we are now offering more daytime courses on weekends. Weekend courses are usually intensive courses with all of the instruction given in one or two days rather than over a six-week period. For those who prefer early evening courses, we have added an earlier time to our schedule. Courses are now offered on weekday evenings between 5:30 and 7:00pm as well as at 7:00–9:00pm.

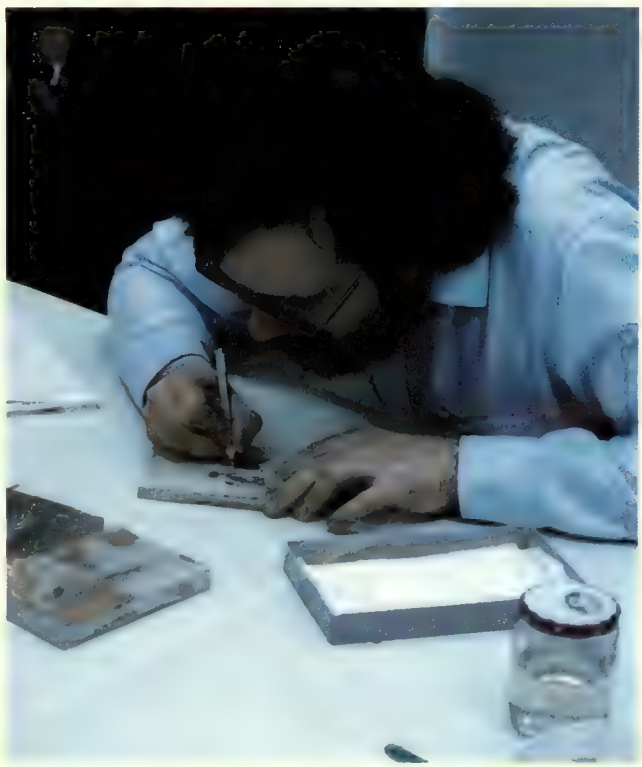
Another major change in scheduling accommodates those who do not like to take courses during the winter months of January and February or during the summer vacation period. The first quarter of the year will now begin at the end of February or the first of March, when most of the extreme winter weather is over for the year. The second quarter will be in May and June, the third in September and October, with the final quarter of the year occurring in November and December.

Thirty-seven percent of the respondents wrote that they did not take courses here because public transportation was unreliable. Some commented that they had to wait too long for buses. While this is a situation that the Museum cannot correct by itself, we have initiated escort service for participants to the nearby bus stop following evening classes. We informed the CTA of our new service and told them that a museum guard would remain with the students until the arrival of the bus, and would record the arrival time. With this new monitoring system, the buses have been much more faithful to their schedules.

A small number of respondents, ten percent, cited the cost of tuition as an obstacle. The typical program course includes 12 hours of instruction and costs $40.00 for members, or $3.33 per instruction

Watercolorist Chuck Schenk compares the different techniques used in two paintings. In-class demonstration and critique of student's work improve their ability.

The study skin of a large fruit bat and a much smaller relative are compared by instructor Barb Clauson (left) and students.



Lance Grande, assistant curator of fossil fishes, demonstrates the proper technique for exposing a fossil fish from a 50-million-year-old limestone deposit.

hour, a cost which has not increased since 1980. When compared with fourteen other institutions in the Chicago area that offer noncredit adult courses, Field Museum's charge is less than ten of the others. Many of the other institutions offer shorter courses. Although our rates are lower, the longer courses mean the tuition rates appear higher.

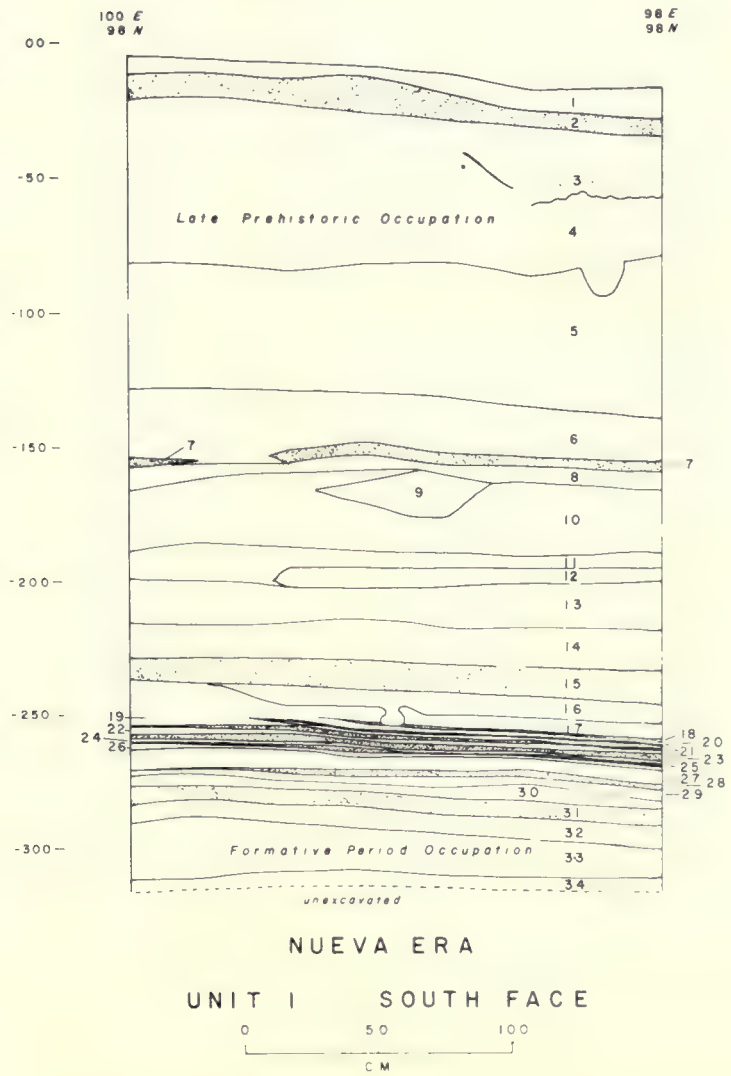
We continue to work on improving the quality of our offering and on remaining sensitive to the needs of our participants. Those who are currently participating in our program are already aware of many of these changes and the response has been very positive. For those of you who have wanted to take a course here but have not, we hope to see you in the near future in an adult course at Field Museum!

Excavation at the Nueva Era site on the western Andean slopes of northern Ecuador clearly shows two meters of volcanic ash between separate prehistoric occupations. The most recent occupation, the Tupe Phase, dates between A.D. 800 and 1600; the earliest occupation, the Nueva Era Phase, dates between 1500 and 500 B.C. Volcanic activity rendered the area uninhabitable for 500 to 1,000 years and radically affected the course of cultural evolution in the New World.

On the Trail of the Finest Metallurgy Of the Ancient New World: *How Old Is the Classic Quimbaya Style?*

by Donald W. Lathrap, John S. Isaacson, and Colin McEwan

As Chicago plans to host yet another World's Fair, it is well to look back at the amazing heritage that the city received from the World's Columbian Exposition, 1893. The fascinating biography of Edward Ayers, which recently appeared in the *Bulletin*, described how the very existence of the Field Museum resulted from this Exposition. So vast is this heritage that it still contains surprises for the diligent researcher.



By the beginning of the last decade of the last century, planning was already well underway for two major international expositions with worldwide involvement celebrating the 400th anniversary of the discovery of the New World. One of these expositions was to be in Madrid, Spain, and the other in Chicago. Planning, however, ran somewhat behind schedule, and nothing opened until 1893.

In Colombia a single commission was appointed to assemble the exhibit that would travel to both of these expositions. The head of this commission was Vicente Restrepo, Knight of the Grand Cross of the Order of Saint Gregory the Great, a wealthy aristocrat and devoted scholar. At a time when archaeology was only starting to emerge as a distinct discipline, he was Colombia's leading archaeologist. Evidently he used professional tomb looters to assemble a very large collection of artifacts of unquestionable authenticity. Restrepo had a handwritten catalog prepared, the original of which exists in English in the archives of the Field Museum. The catalog detailed all of the specimens in the travelling exhibit. Presumably, there still exists a version in Spanish in Bogotá and Madrid, and a comprehensive set of photographs covering all specimens was also prepared. Several photographs of this set are in the negative file in the Field Museum and it is hoped that the full set can still be found in Bogotá or Madrid.

At some point after this catalog was prepared to be used with the travelling exhibit in both cities, there was a change of plans, and the most spectacular gold pieces were presented as a gift from the government of Colombia to the queen of Spain. Presumably this was a symbolic repayment

Profile (sidewall) of Isaacson's excavation at Nueva Era site (photo at left), showing stratigraphic relationship between the two prehistoric occupations and the deep fall of volcanic ash.

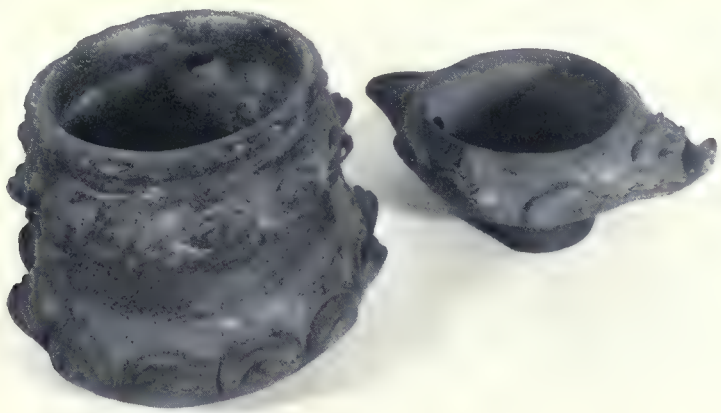
Donald W. Lathrap is professor of anthropology at the University of Illinois, Urbana, and a Field Museum research associate, Department of Anthropology. John S. Isaacson and Colin McEwan are doctoral candidates in anthropology at the University of Illinois, Urbana.

of the gold Isabella gave to Columbus. Since the Chibcha-Muisca gold style was by far the most common, a large number of specimens in this style ultimately arrived at the Field Museum and are still in the collections, but all the larger gold pieces in the style which has come to be known as Classic Quimbaya remained in the Museo de América, Madrid. This treasure presently represents more than 75 percent of all specimens known in this style. It would appear that Spain kept very few of the ceramic pieces, comprising some 1,300 items, so that the full collection, minus

Lime flasks of tumbaga, *gold-copper alloy, cast in the lost-wax technique with gold-enriched surface. These exemplify Classic Quimbaya style. They form part of the Restrepo exhibition given to the queen of Spain and now in the Museo de América, Madrid. Lime was used in conjunction with the sacrimental chewing of coca leaves. The print is duplicated from one in the original Restrepo catalog.*

Tunjos, *votive offerings, of gold-copper alloy, with gold-enriched surface, cast by means of the lost-wax technique. These are typical of the rather rustic, state-enforced style of the Chibcha kingdoms encountered by the Spanish.*

the most spectacular gold pieces, arrived in Chicago and was installed in the Colombian Pavilion at the Chicago's World Colombian Exposition. That collection never left Chicago and, like much of the other ethnographic and archaeological materials assembled for the exposition, remained to become the permanent collections of the Field Museum.



Specimens of "Incised Brownware." The beer mug (right) in the shape of a caiman, the South American crocodilian, is of great importance in demonstrating the time depth of South American Indian cosmologies. It is analogous to the sacred beer mugs of the Inca empire.

In the early 1930s, the then curator of Middle American and South American archaeology (1927-1935), the late Sir J. Eric Thompson (later to become the outstanding Maya scholar of his generation) reorganized the South American archaeological exhibits (Halls 8 and 9), and prepared an illustrated guide. With his eye, well trained to the nuances of Mesoamerican archaeology, Thompson recognized the stylistic unity of a small number of ceramics from the Quimbaya area, correctly pinpointed their Formative or Proto-Classic nature and segregated them in the exhibit cases. Striking confirmation of Thompson's intuition is now made possible by piecing together a veritable jigsaw of different pieces of evidence.

The great stylistic diversity of Colombian gold work has long claimed the attention of New World scholars and given rise to a very large literature. All of these studies have recognized the distinctive nature of "Classic Quimbaya." There has been much speculation concerning its relationship either as an antecedent to, or outgrowth of, various other styles. The late William Root reasoned that, since Peru was always more advanced than Colombia, and since gold working does not appear in northern Peru until about 400 B.C., all Colombian gold working, especially styles with the technological sophistication of Quimbaya, must be considerably later. He assigned the guesstimate of A.D. 400-800 for the span of Classic Quimbaya. This guess has since been repeated frequently and uncritically over the years.

Given the volume of the literature and the superb quality of the illustrations, it is surprising that there is, to date, only one study which attempts to build a chronology of the Colombian gold styles on internal evidence and which uses an operationally sound method as exemplified by the qualitative seriation first applied by G.M.A. Richter to Attic Red Figured vases. Charles Bolian, of the University of New Hampshire, using qualitative seriation, has presented a chronology of the Darien gold style which must not be ignored, and has given temporal direction to his seriated sequence by such securely dated points as its appearance in the sacred cenote at Chichén Itzá, the May-

Sketch of ceramic urn in "Incised Brownware" in the collection of the Museo Nacional, Bogotá (after Bruhns, 1969-70). Note the stylistic identity between the modelled human figure on this burial urn and the female figures on the Classic Quimbaya lime flasks (p. 12, top). Note also the distinctive convex, arcaded bosses shared by the urn and the cast tumbaga *vessels.*

Cast tumbaga *figurine in the collection of the Cleveland Museum of Art. The characteristics of this unique piece link the beginnings of the Darien style to Classic Quimbaya style. Photo courtesy the Cleveland Museum of Art, gift of Mr. and Mrs. Raymond Henry Norweb.*

an sacrificial site in Yucatan. His suggestion for the beginning of the Darien style at around 200 B.C. appears to us to be well motivated. A unique specimen in the Cleveland Museum of Art firmly links the Quimbaya style to the beginnings of the Darien style, an observation which anticipates our own conclusions and which should have rendered them less startling. Had the range of Colombian gold styles been studied by an artistic genius such as the late Miguel Covarrubias, we believe that he would have instinctively identified the Quimbaya style as the "mother style" comparable to the position of the Olmec in Mesoamerican artistic evolution. Thus, he would have placed Quimbaya at the base of a branching evolutionary tree. The Vicus gold style of northern Peru, though executed in a less sophisticated hammered and soldered technology, is stylistically derivative of Classic Quimbaya. Vicus dates to around the time of Christ, a further indication that Root's guess was far too conservative.

At the Society for American Archaeology meetings in Milwaukee in 1969, Karen Bruhns presented a paper describing a particular style of pottery which she, following a summary paper by Wendell C. Bennett, designated Brownware Incised (we prefer, and will continue to use, the term "Incised Brownware" until an appropriate geographical designation is agreed on). Most importantly she demonstrated that the "high relief" human figures that occurred on some Incised Brownware urns were identical to the human figures on Classic Quimbaya gold. She illustrated a number of pieces mainly from collections in Colombia, but made no mention of the Field Museum's materials, the largest collection of these ceramics outside of Colombia. We equate the Field Museum series with "Incised Brownware," although it also includes white-slipped polychromes and zoned-red pieces. Shared identities in the execution of modelling and incision on both slipped and unslipped examples make this equation secure.

The logic of Bruhns's argument is impeccable. There can be no doubt that Classic Quimbaya gold and Incised Brownware come from the same cultural matrix. She discusses the difficult problems raised by the dating of Incised Brownware:

> ... the Brownware Incised pottery cannot belong to the historic Quimbaya. Because the places where these urns have been found often fall well within the known Quimbaya territory, it seems likely, then, that they predate the Quimbaya [as they are known ethnohistorically].... How much before this date is anybody's guess. Sometime before 500 A.D. but perhaps after the turn of the millenium [sic] would be reasonable. This date corresponds to Root's guess dates of 400-700 A.D. [sic] for what he calls 'Classic Quimbaya' in metal.

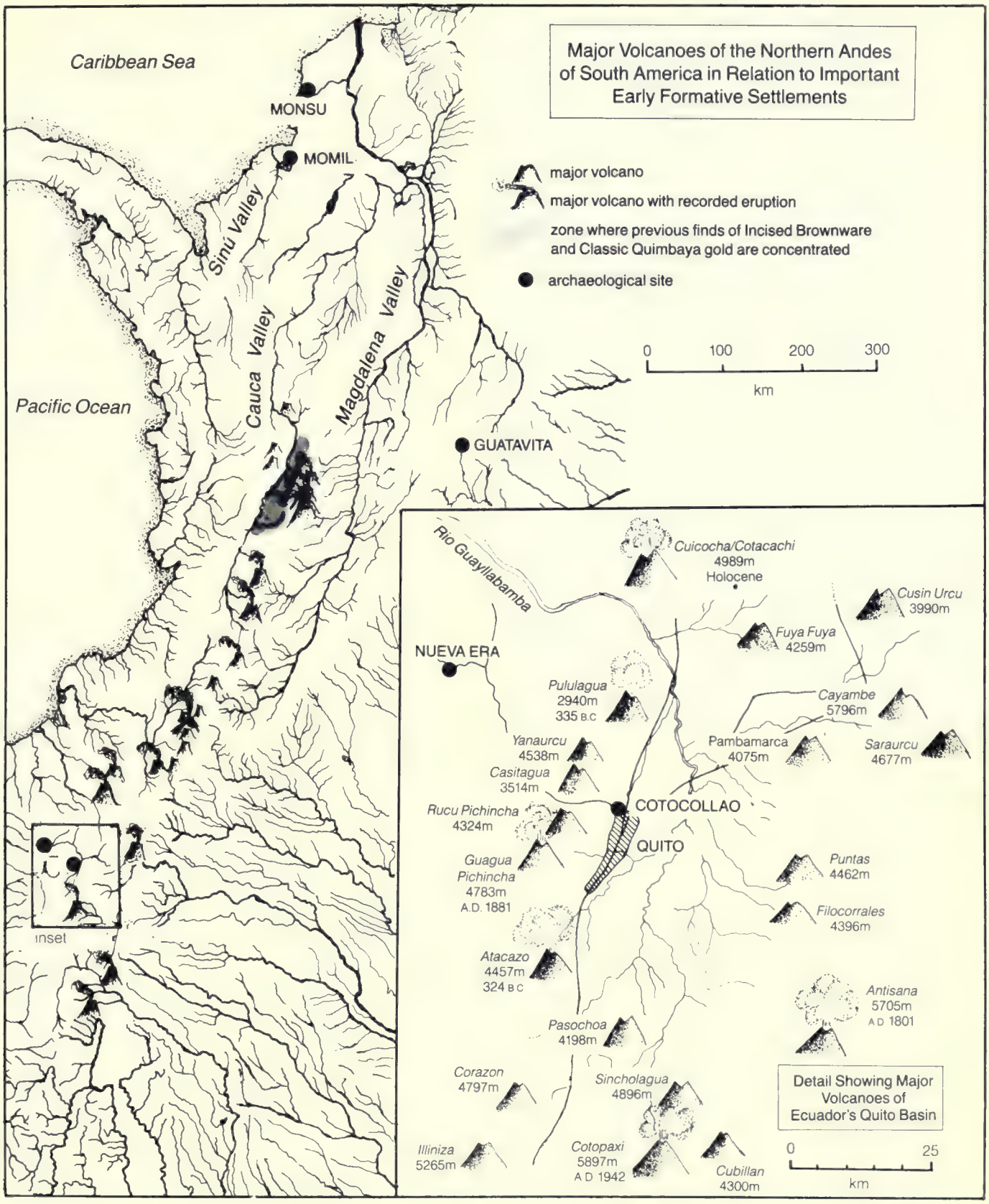
Though she equivocates, it is to Bruhns's credit that her estimate of A.D. 1-500 is the first to place in question Root's conservative guess of A.D. 400-800. Her thinking was in the right direction.

During his many trips to the Field Museum while assisting in the preparation of the exhibit *Ancient Ecuador,* 1972-74, coauthor Donald W. Lathrap looked at the specimens that had been segregated by Thompson and noted both the identity of spout form between these vessels and his Late Tutishcainyo ceramics from the Central Ucayali River in Eastern Peru, and the identity of rim treatment between the Chicago materials and the Cave of the Owls fine ware from the famous oil bird cave near Tingo María in eastern Peru. As Lathrap remembers:

> It was clear to me that this pottery ought to date as early as 1500 B.C. in terms of its close relationships to well-dated styles in the tropical lowlands east of the Andes. Each time I passed the cases, I said to myself that I must check the accession records and find precisely where this pottery came from; but I never allocated the time.

Starting in 1980 and continuing through 1983, archaeological excavations at the Nueva Era site in the western Andean foothills of northern Ecuador were conducted by coauthor John S. Isaacson. He remembers that his thinking about the project had an interesting evolution:

> I had originally gotten involved in the Tulipe Project to study the large, Late Period settlements in the Tulipe Valley, first discovered by Frank Salomon [1978]. After a test excavation of a small house platform in 1980, I realized that a large scale project focused on the Late Prehistoric occupation of the valley was feasible. The major drawback was that the Late Period ceramics from Tulipe were generally plainwares which exhibit very little change over long periods of time. As I was preparing to return to the U.S. after the 1980 field season, my Ecuadorean coinvestigator, Holguer Jara, who was reconstructing a number of large stone structures for the Museo Arqueológico del Banco


Major Volcanoes of the Northern Andes of South America in Relation to Important Early Formative Settlements
major volcano
major volcano with recorded eruption
zone where previous finds of Incised Brownware and Classic Quimbaya gold are concentrated
archaeological site
0 100 200 300
km
Caribbean Sea
Pacific Ocean
MONSU
MOMIL
Sinú Valley
Cauca Valley
Magdalena Valley
GUATAVITA
inset
Rio Guayllabamba
NUEVA ERA
Cuicocha/Cotacachi 4989m Holocene
Cusin Urcu 3990m
Fuya Fuya 4259m
Pululagua 2940m 335 B.C
Cayambe 5796m
Yanaurcu 4538m
Pambamarca 4075m
Saraurcu 4677m
Casitagua 3514m
Rucu Pichincha 4324m
COTOCOLLAO
QUITO
Guagua Pichincha 4783m A.D. 1881
Puntas 4462m
Filocorrales 4396m
Atacazo 4457m 324 B C
Antisana 5705m A D 1801
Pasochoa 4198m
Corazon 4797m
Sincholagua 4896m
Illiniza 5265m
Cotopaxi 5897m A D 1942
Cubillan 4300m
Detail Showing Major Volcanoes of Ecuador's Quito Basin
0 25
km

Donald W. Lathrap "rediscovering" "Incised Brownware" in a Field Museum storeroom. This vessel shows the rim treatment typical of the early Amazonian style "Cave of the Owls Fineware" and the distinctive arcaded bosses, which link "Incised Brownware" not only to the cast tumbaga flasks of Classic Quimbaya, but also to the earliest Formative pottery of Southeastern Mesoamerica, Barra and Ocós.

Central del Ecuador, discovered a buried soil surface some 3 meters below the present ground surface. His interests were in the reconstruction of the Late Period structures and so he sent me the few ceramic sherds which he recovered from the buried surface. I analyzed these at the University of Illinois and quickly saw the importance of this material, relating it to Formative Period ceramics recovered from sites in the highlands of Ecuador. I felt that the problems presented by the earlier material and its stratigraphic context under such a deep column of volcanic ash presented more challenging archaeological problems than the Late Prehistoric Period.

It was while I was back in the field in 1981 that I decided to direct my energies to an expanded excavation of these earlier materials. I was fortunate to stay, while in Tulipe, with Teniente Eustorgio Rosero Arturo and his family on Hacienda Nueva Era, and I have named the site Nueva Era after the Hacienda as an expression of my eternal gratitude for the warmth and hospitality of Eustorgio and his family. I have defined two prehistoric occupations at the Nueva Era site separated by more than 2 meters of sterile volcanic ash. The most recent occupation dates between A.D. 800-1600, and I have named it the Tulipe Phase. This is a component of the numerous Late Period sites which dot the Tulipe Valley landscape. Below this occupation and the deep column of volcanic ash, is the much older archaeological component, Nueva Era Phase, which dates between 1500-500 B.C.

The Nueva Era stratum produced a number of domestic structures with associated hearths and floor refuse, producing a surprisingly wide range of Middle Formative pottery. Even more startling are the differences between this material and the Middle Formative pottery buried under a much thinner layer of the same volcanic ash at the site of Cotocollao, 40 km to the southeast, in what is today suburban Quito. Ongoing ceramic analysis in the South American laboratory at the University of Illinois is clarifying this difference. While the Middle Formative of the Quito basin is most closely related to the Tutishcainyo traditions of the Amazon, the Nueva Era ceramics are clearly an extension of the very early Colombian Formative of Momíl I on the Sinú floodplain in northern Colombia.

In consultation with Lathrap, Isaacson recognized several sherds made of what appear to be exotic clays, and with a style of decoration otherwise absent at the Nueva Era village. These exotic sherds, they now realize, are none other than Karen Bruhns's "Incised Brownware." Isaacson's careful excavations make it clear that these materials date in the 1500-600 B.C. time range, demonstrating for the first time a clear chronological placement for "Incised Brownware," and, by extension, Quimbaya gold.

These excavations, those of Petersen and Porras at Cotocollao and the well-published surveys of Bray and associates covering several segments of the Cauca Valley have all revealed stratigraphic profiles with deep ash lenses frequently superimposed over cultural strata. From this we conclude that the entire zone of recent volcanic activity extending from well south of Quito to the lower Cauca Valley was in violent eruption. The dating of all the individual eruptions remains to be determined, but we can safely infer that most of these clustered in the period 600 B.C. to A.D. 1.

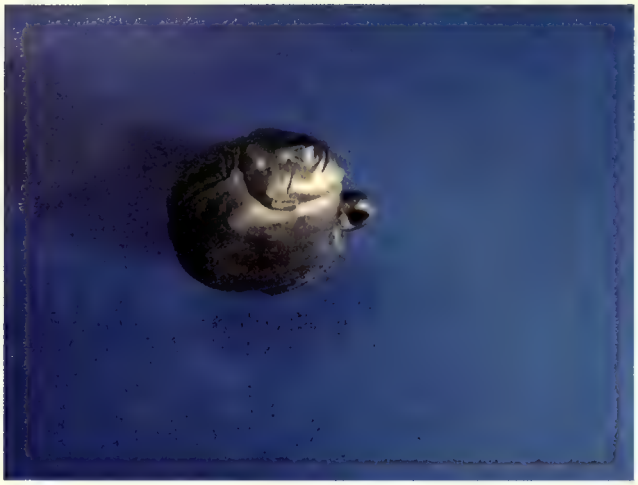
In retrospect, we can note that students of Colombian archaeology showed a remarkable lack of curiosity about what might lie under the blanket of volcanic ash upon which all of the Late Period sites rest. Again, as was the case with Root's dating of Quimbaya, there seems to have been a misplaced reliance on authority—on the sanctity of what had been published only as opinion. In 1942 the late James A. Ford made a moderately detailed survey of the Upper Cauca Valley, finding only Late Period sites, and relatively few of those. Ford made the suggestion that the rich valley bottom of the Cauca could not have been exploited without labor intensive agricultural techniques, a suggestion which is correct when applied to the pampas around Buenos Aires, and even the Sabana de Bogotá, a waterlogged grassland. The ghost of that brilliant and ironic archaeologist is probably both amused and angered that his modest suggestion became a charter for casual thinking and a lack of curiosity about the paleoecology of the Cauca on the part of his followers.

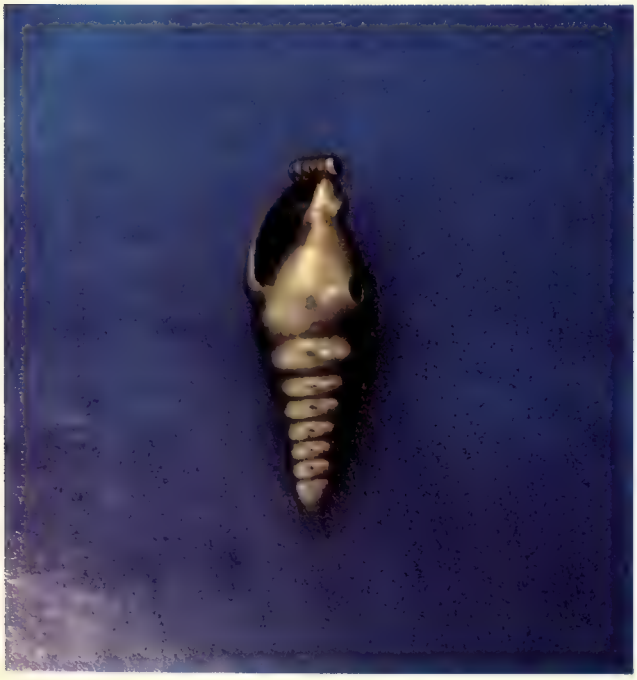
The few tombs which have produced Classic Quimbaya must be buried beneath this heavy volcanic mantle. As we take this as an hypothesis and turn to Bruhns's map of the sites which have produced Incised Brownware, we find that, as would have been predicted, all such sites are located uniquely on the downwind slope of the greatest concentration of recently active volcanoes in Colombia. From all these bits of information it follows that the most sophisticated lost-wax casting of gold-copper alloy in the New World was being practiced in the Cauca Valley of Colombia and predates 600 B.C. The people responsible for this civilization were wiped out or driven away by an immense outburst of volcanic activity which involved not one but a series of Pompeii-like volcanic disasters.

For the first time we have an explanation why, since the time of the Restrepo collection, so few further examples of Classic Quimbaya gold have appeared. In 1910 the British Museum acquired 17 fine pieces. A modest collection is on exhibit in Berlin. There are two frequently illustrated specimens in the museum of the University of Pennsylvania, and single specimens are scattered in a few

Cast tumbaga *beads from the Restrepo exhibition, now in the collection of Field Museum. These beads are from the same necklace as examples in the Museo de América, Madrid.*

Human effigy vessel with red-on-white painting. The orange unslipped ceramic adds a third color to the decorative scheme. This remarkable specimen was illustrated in the catalog prepared some 50 years ago by Field Museum curator J. Eric Thompson, but was not subsequently exhibited.





other museums. But in its extensive collecting of gold, the Museo del Oro, Banco de la República, Bogotá, Colombia, has obtained few further large examples in the Classic Quimbaya style. It cannot be accidental that Restrepo's campaign of excavations in the 1880s produced the only collection that contains both large numbers of Classic Quimbaya gold objects and a major assemblage of Incised Brownware vessels.

Isaacson is presently analyzing volcanic ash samples from the ash column at the Nueva Era site in Ecuador and comparing these to source material from the numerous volcanoes in the vicinity of that site provided by Minard Hall of the Escuela Politécnica Nacional in Quito. These correlations of volcanic ash will represent the first attempt at constructing a tephrochronology (mineralogical "fingerprinting" of volcanic ash) of the northern Andes.

On May 31, 1984, Lathrap made a trip to Chicago with coauthor Colin McEwan, a long-time fieldworker and colleague of Warwick Bray (Institute of Archaeology, London), the world's foremost expert on Colombian gold. Their immediate purpose was to verify the orientation and size of certain Chavín and pre-Chavín temples in consultation with the Museum's curator of Mesoamerican and South American archaeology, Michael E. Moseley. This task was quickly finished, and on a hunch, stimulated by Isaacson's discoveries, Lathrap insisted on examining the South American storage area. In the course of this search, Lathrap, McEwan, and Field Museum Research Associate Ronald Weber stumbled across approximately fifteen more pieces of "Incised Brownware." Recalled McEwan afterwards: "Lathrap was as excited as if we had broken into a previously undisturbed tomb." Among these pieces was a spectacular polychrome example illustrated by Thompson but thereafter placed in storage.

A ceremonial beer mug in the shape of an alligator was particularly intriguing to Lathrap, who has long been fascinated with the mythological importance of the giant South American crocodilian, the black caiman. Ronald Weber assisted Lathrap and McEwan in recording both the specimens in storage and those on exhibit that had been correctly segregated by Thompson as early and quite distinct from the other ceramics from the Cauca Valley. With these catalog numbers they then returned to the accession records and archives and examined the minutely detailed catalog prepared by Restrepo in 1893—the first time these materials had been examined in several decades. From this catalog it becomes almost certain that the "Incised Brown-

Top and center: *Cast* tumbaga *rattles from the Restrepo exhibition, now in the collection of Field Museum. The human representations are diagnostic of Classic Quimbaya style.*

Bottom: *Cast* tumbaga *seashell with gold-enriched surface from the Restrepo exhibition, now in the collection of the Field Museum.*

ware" pottery at the Field Museum comes from the same tombs (probably numbering not more than five or six) that produced the Classic Quimbaya gold pieces now in Madrid.

Expanding the search within the Field Museum, the few negatives from the full "photographic record" of the Restrepo catalog were located, and several small but exquisite examples of classsic Quimbaya gold work from Restrepo's tombs rediscovered. Beads in the form of human heads are identical to specimens in Madrid and probably come from the same necklace. Two small rattles have the same distinctive human representations. A gold seashell effigy is small, but is as stunning an example of lost-wax casting as can be found anywhere. In short, the area of the New World which had attained the most sophisticated metalworking techniques, and was certainly highly advanced in other aspects of culture, was rendered uninhabitable for a period of between 500 to 1,000 years. In the future, archaeologists must reckon with the far-reaching effects of this catastrophe on the course of cultural evolution in the New World.

There are a number of fascinating implications that immediately come to mind once the above scenario has been accepted. One of the most colorful of these concerns the great round crater lake, Guatavita, in the highlands near Bogotá, where the coronation of the Chibchan ruler was consecrated by offerings of vast quantities of gold. The Spanish chroniclers give details of this ritual in which valuable items of all kinds were thrown in the lake. The lake itself and the ritual immediately bring to mind the sacred cenote at Chichén Itzá, where both gold and virgins were periodically offered for the health and stability of the community. We now suggest that Lake Guatavita offers the legitimate historic antecedent from which the Maya ritual at Chichén Itzá developed.

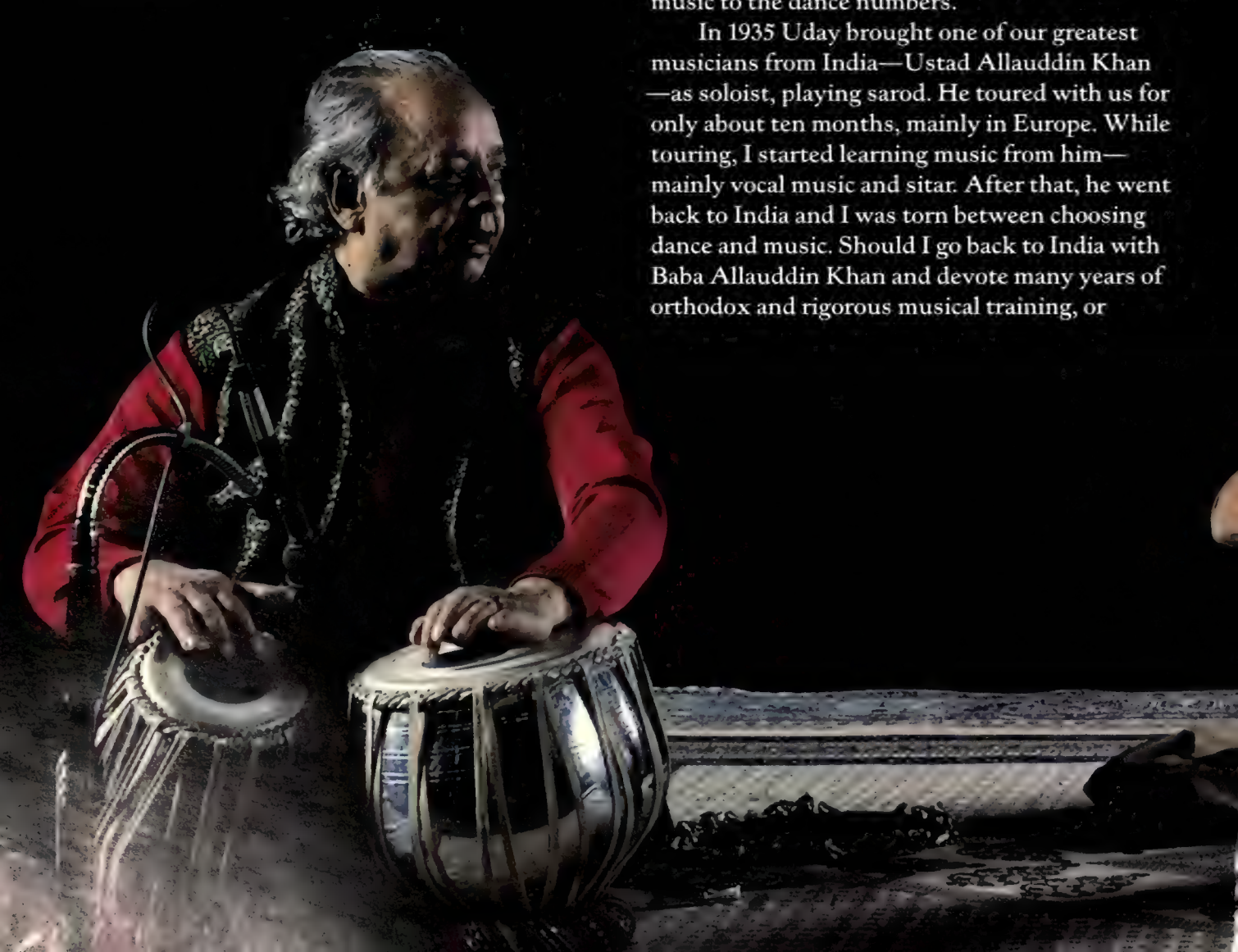
Dense occupations of the Sabana de Bogotá and the Chibchan States, as such, are relatively late, but some of the ceramics recovered from the dredging of Guatavita are clearly in the Incised Brownware tradition; and a carbon 14 assay on carbon from the core of a cast gold specimen from the lake is A.D. 645 ± 95, far earlier than the origin of the Chibchan States. The sanctity of Guatavita dates back to the Middle Formative. This observation should be coupled with Reichel-Dolmatoff's excavations at Monsú. Here on the Magdalena flood plain we find communities with intensive agriculture and fancy pottery fully 1,500 years before similar developments in either Mexico or Peru. Indeed, stylistically the pottery is a plausible antecedent for the earliest pottery in both Mexico and Peru. That the basic structure of the religions of Mexico and Peru was already fully formulated in Colombia by 3500 B.C. is now moved from the realm of science fiction and into the realm of probability. Examples of gold work in the Darien style, a clear outgrowth of the Quimbaya style, have been recovered from both sacred lakes, showing that both were "Meccas" in the same overarching religious system. This network of religious pilgrimage underscores the essential unity of New World high civilizations.FM

Guatavita, the most awesome of the five sacred lakes of the Chibcha States. Votive offerings were dumped here at the coronation of each Chibcha ruler. The crater was formed by the collapse of a dissolved salt dome. Photo courtesy Warwick Bray.

My Life, My Music

by Ravi Shankar

Performing in the Field Museum brings back my first visit to Chicago in January 1933 with my late brother Uday Shankar's Troupe of Hindu Dancers and Musicians. We made a brave effort to walk from the Congress Hotel to Orchestra Hall in a blizzard at 10 degrees above zero.



In looking back on these 52 years of experience with American audiences, I can say that their appreciation and understanding of the arts of India has grown enormously. My brother, Uday, was the first pioneer to bring dance and music from India to the West from 1930 to 1938. I was more of a dancer in his troupe, but I also played several instruments for background music to the dance numbers.

In 1935 Uday brought one of our greatest musicians from India—Ustad Allauddin Khan—as soloist, playing sarod. He toured with us for only about ten months, mainly in Europe. While touring, I started learning music from him—mainly vocal music and sitar. After that, he went back to India and I was torn between choosing dance and music. Should I go back to India with Baba Allauddin Khan and devote many years of orthodox and rigorous musical training, or

should I spend more time in the West as a dancer, touring and enjoying all the glitter, glamour, and freedom it offered? But I guess the advent of World War II changed my brother's plan; it also helped me to choose my career and to take music as my main course in life.

After many years of studying Indian classical music on sitar under Baba Allauddin Khan and becoming quite well known in India (as a composer and performer of ballet, film, and orchestral music), I thought of bringing our serious form of classical music to the West. I did my own pioneering work, beginning in 1956. There wasn't a large audience initially, but it gradually grew with each visit. I performed, gave lecture-demonstrations and interviews, and cut many albums, including an anthology of Indian music. By the late 1950s I was performing in all the major concert halls in Europe, the U.S.A., and Canada—a first, indeed, for any Indian musician. It was a thrilling experience for me, and I was elated that I could transmit the spirit and depth of

Overleaf *Ravi Shankar (center) playing the sitar, with Alla Rakha (left) playing tabla, the performer at right is a student.*

The charismatic Ravi Shankar first performed in Chicago more than 50 years ago.

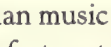
our music to the people of the West. For most of them, our music had been like a museum piece—bracketed in the "ethnic" group of art form—and to others merely "esoteric" and "exciting."

In the early 1960s my association with my dear and esteemed friend Yehudi Menuhin had wonderful results. In particular, I wrote a few pieces based on pure *ragas* and *talas,* which we first performed at festivals in England; later our recording of this received the Grammy award. In the following years I made two more albums and performed all over the world with the great Menuhin. Another favorite musician with whom I composed and recorded was Jean Pierre Rampal, the renowned flutist.

Then there came the big phase in the mid-sixties. I was catapulted into Superstardom in the "pop" sense when George Harrison of the Beatles became my student. This lasted five or six years. Unfortunately, it was such a mixed-up period of hippies, drugs, Vietnam, Yoga, Tantra, and Kamasutra. But despite the fact that the approach of the young and immature was superficial, it was also true that millions of these young people all over the world came to know for the first time about sitar and Indian music in general. The fad died gradually, and the innumerable listeners dwindled away—but the very few that remained (quite a large number actually) are still there today and are devoted listeners to Indian music.

The two sitar concertos with symphony orchestra that I wrote (1970, 1981) also introduced to our music a large number of people who usually go to hear only Western classical music. There are various universities in the West where Indian music is taught in "world music studies." Unfortunately, however, some schools continue to offer it under the category of "ethnic" music ("ethnomusicology"), along with Chinese, Indonesian, Vietnamese, and African music. I would like to clarify my objection to this. I strongly believe that these others are traditional music; some are folk music. Their development stopped quite some time ago. There are only two types of classical music that exist today. They are the Western classical and Indian classical music —the latter started from hymns of Vedas about 2,500 years ago from a religious basis. Indian classical music has gradually developed into the performing arts, being influenced to some extent by folk and regional music that existed in earlier periods. Being an oral tradition, it was passed down from guru to disciple—at times from father to son. And it has been enriched through innovations and developments that are still going on. But Indian classical music has always maintained a very sound and scientific basis. The two main elements are the *ragas* ("melody" forms) and *talas* ("rhythmic" cycles). The most important thing is the amount of improvisation one does while performing, keeping to the strict rules. It is a music that is alive and still growing, without influence by alien music.

Ravi Shankar, together with Alla Rakha, performs November 16 and 17 in James Simpson Theatre. See pp. 3, 4 for details.

Western classical music also started from a religious base—the church, Gregorian chants. The only difference is that instead of relying solely on oral tradition, it developed a written notation system, and great composers through the last few centuries have been able to create music consisting of fixed compositions for solo, duo, trio, quartet, chamber, or symphony orchestra. These immortal compositions will endure, though they may vary slightly because of the individual musician's or conductor's interpretation. Western music is also enriched by chords, harmony, counterpoint, modulation dynamics, and so forth. The highlights of Indian music are in its melodic richness and highly sophisticated, intricate application of rhythm. It is also said that the notes used in Indian music are in curved lines (), whereas in Western music the notes are cornered ( ), which means that instead of staccato or legato we use *meend* and *gamak*—where one note slides or merges into the other note in a special manner that is different from the Western glissando.

To be able to understand and appreciate Indian music one must listen to it with all these things in mind, letting one's heart and emotion take over in the beginning—before going into mere technicalities. The spiritual aspect of our music, especially in the first part of a concert, is also something that can be very relaxing and meditative. This is why the Indian sages have always emphasized *nada Brahma* —an old saying meaning "sound is God."FM

The Right Gift at the Right Time

Jack C. Staehle Makes a Difference

by **Glenn Paré**
Grants Officer, Planning and Development

"To give away money is an easy matter and in any man's power. But, to decide to whom to give it, and how much and when, and for what purpose and how, is neither in every man's power nor an easy matter. Hence it is that such excellence is rare, praiseworthy and noble."—Aristotle

The activities Field Museum undertakes are as varied, diverse, and important as the collections we house, the exhibits we display, and the audiences we serve. Field Museum exists to preserve, increase, and disseminate knowledge of natural history; and attempting to fulfill this mission is an expensive endeavor. In large part, much of who we are and what we do is dependent upon the many gifts and grants we receive in support of research, collection maintenance, educational programs, and special projects. Aristotle foresaw this support when he called such inspired giving "praiseworthy and noble." Because this giving is integral to our operation, we intend to overview grant-supported activities on a somewhat regular basis here in the *Bulletin*.

Enumerating these noble efforts by individuals, foundations, corporations, and other public and private agencies illustrates the vast scope of Field Museum while underscoring the important difference the right grant at the right time can make. Perhaps a good place to begin, and a prime example of this kind of support, is Jack C. Staehle's two recent grants to the Department of Botany totalling $32,754. Through the years, Staehle has been a close friend and strong supporter of Field Museum. Now, because he is interested in South America and is concerned about preserving and enhancing our knowledge of ourselves and the world, he is supporting the work in Botany, helping to ensure that important collecting and cataloging is complete before time and nature make these tasks impossible. That he would be concerned enough to support the department's collecting and research at this level is not surprising when one has the good fortune to know Staehle.

Staehle's interests in scientific collecting began at an early age and were specifically enhanced in high school when he studied zoology and botany, among other subjects, under E.E. Hand. Professor Hand, whose extensive shell collection today is housed at Field Museum, encouraged the collecting interests of his students by promising better grades for those who could collect quotas of assigned species. Staehle recalls his own youthful passion for collecting and smiles when he talks about the jars full of insects and other specimens he and his classmates collected.

Later in life, Staehle also began to develop a personal interest in South America. As a vice president for Aldens, one of the nation's largest mail order catalog firms, he was recruited by the U.S. State Department to conduct management seminars for corporate executives in many developing countries such as Argentina, Peru, Chile, Ecuador, and Venezuela. In all, he has made some eleven trips to South America and has enjoyed the experience, especially in trying to understand better the cultural differences and similarities between us and our neighbors to the South. Along these lines, he has devoted considerable time to studying the Aztec and Inca civilizations, only to be impressed by their culture, craftsmanship, and their technical knowledge evidenced by elaborate buildings and extensive highway systems. Drawing comparisons, according

Ron Testa

Jack C. Staehle (rt.) with Timothy Plowman, associate curator of Botany, in Plowman's laboratory.

to Staehle, is the key to understanding the present cultures and peoples of South America; hence, better understanding their interrelationship with us.

His combined interests in collecting and in South America, however, may go back still further; perhaps they are in his blood. In 1817, Staehle's great-grandfather collected live specimens of "rare and curious Creatures from the Four Corners of the Globe," and took the menagerie to South America on a money-making tour. When he later returned to this country and settled into farming in southern Wisconsin, he brought with him animals no more exotic than a small flock of merino sheep.

Today, Staehle still spends time on the family farm, but several years ago, in an airport in Arequipa, Peru he made an unusual and pleasant discovery. When he stopped to purchase souvenirs for his wife and daughter the shopkeeper offered him two gold medallions. Pictured on one was a llama, native to the area; on the other, surprisingly, was an elephant. According to local legend, an American had once brought a circus through the area and donated his elephant to the local people to start a zoo. The elephant, a big hit, lived a good number of years and became such a local favorite that his popularity long outlived him. Haunted by the coincidence and familiar ring to some of the tale, Staehle pieced through family documents and the original passports, and discovered that the elephant's donor was none other than his great-grandfather.

Like his ancestor, Staehle thinks big. His current concern is with putting natural history and the entire world into proper perspective. He is, and has been for some time, engaged in compiling and writing a "Chronology of the Earth" covering the past

20 billion years, from formation of the earth and moon to the present day; parallel to this, he is attempting to complete and maintain an encyclopedic indexing of "Patterns: Peoples, Places and Diseases." His grant to the Department of Botany is a natural extension of his interests and concerns and the support is an important resource for the department's study and work relative to South America.

The department holds more than 2.5 million plant specimens widely representative of the earth's vegetation; the collection is particularly strong in the flora of Central and South America. For more than fifty years, Field Museum botanists have been committed to taking a census of and cataloging the flora of this region, especially the countries of Peru and Costa Rica. This massive undertaking, now nearing completion, has earned the Department of Botany a well-respected reputation worldwide. Staehle's grant support is assisting Museum botanists in their collecting and fieldwork as well as aiding and improving their productivity back in their Museum laboratories.

Importantly, Staehle's grant will help Botany develop a comprehensive study of the ethnobotany of the Amazon tribes in eastern Peru and the adjacent areas of Ecuador, Bolivia, and Brazil before the natural areas are destroyed and the native cultures dissolved. The jungles of the Amazon basin contain perhaps 60,000 species of plants. Native Indians have a profound knowledge of this flora and, over thousands of years, have discovered a myriad of uses for the local plants, including plant medicines. The rapid absorption of the native groups into modern culture and the development and deforestation of land areas, however, threaten to eradicate this untapped knowledge and the very plants themselves.

Associate Curator Timothy Plowman is utilizing some of the funding for his ongoing studies in the coca family. This work includes research on the evolutionary relationships and geographical distributions of the tropical American species and the ethnobotany, chemistry, and medicinal uses of cultivated varieties of coca. His research is important not only for organizations attempting to control illegal cocaine production in South America, but also for governmental agencies in Peru, Bolivia, and elsewhere that are attempting to find legitimate medicinal uses for the coca plant.

The support from Staehle's grants will allow Plowman to continue work such as that just completed with William Vickers, of Florida International University—a comprehensive study of the useful plants of the Siona and Secoya Indians of Amazonian Ecuador, based on plant collections made by anthropologist Vickers in 1973. This detailed study of the plants used by a single cultural group in the western Amazon will serve as a model for similar studies among the numerous disappearing tribes throughout Amazonia. Plowman's work will also provide a unique opportunity to compare plant uses among linguistically unrelated tribes living in the same habitats containing many of the plant species. Plowman and Vickers have recently published their research findings in *Fieldiana*, Field Museum's continuing series of scientific monographs.

Assistant Curator Michael O. Dillon, with support from Staehle's grants, is studying isolated plant communities in the coastal desert of western Peru and northern Chile. While the desert is considered one of the world's driest, fog drifts in from the Pacific and settles on low coastal hills forming islands of vegetation called *lomas*. When the fog or dew is of sufficient quantity and remains long enough, plants remarkably bloom and flourish. Many plant species, several genera, and at least one entire family, are found nowhere else.

Dillon is conducting research to provide a thorough survey of these "islands" in an attempt to answer several biological and evolutionary questions relating to the origin of loma plants and the formations themselves. In 1982 and 1983 the unusual weather pattern of *"El Niño"* brought heavy rains to the lomas causing rare plants, perhaps never before seen by man, to flower. Dillon is currently in Peru collecting and conducting fieldwork to study the long-term dynamics of these unusual formations.

Jack C. Staehle is making a difference. With his grant support, Museum botanists are working on projects and carrying out tasks to a greater extent than would be possible during these times of limited research funding. With his support, Field Museum is answering Staehle's concerns for preserving and enhancing our knowledge of ourselves and the world in which we live. His strong continued support and the recent grants of $32,754 are what we consider "praiseworthy and noble." FM

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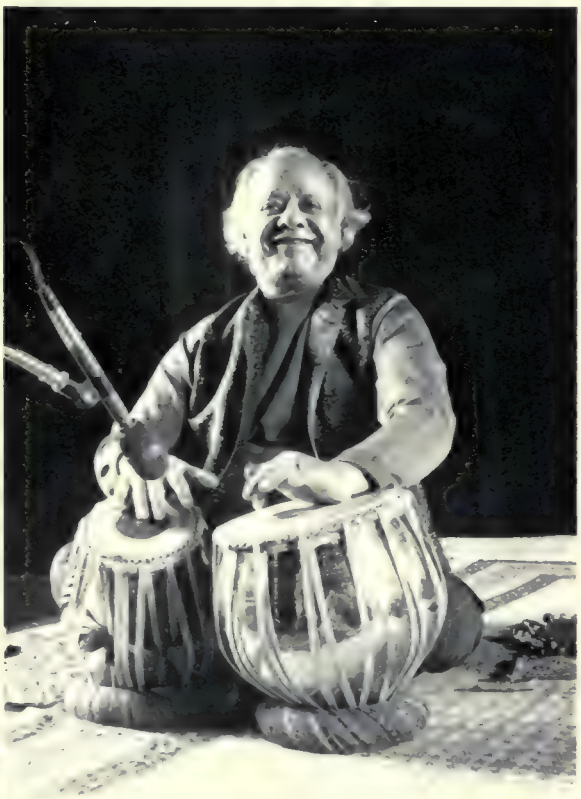
Indrani performs classical Indian dance Nov. 24

JOHN ISAAC

Ravi Shankar performs Nov. 16, 17

STEVEN E. GROSS



STEVEN E. GROSS

Alla Rakha performs with Ravi Shankar Nov. 16, 17

JOHN ISAAC

Sukanya performs classical Indian dance Nov. 24

FIELD MUSEUM OF NATURAL HISTORY BULLETIN

December 1984

1985 CALENDAR

"The Year of the Gemstone"

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I certify that the statements made by me above are correct and complete. *Jimmie W. Croft*, vice president for Finance and Museum Services.

CONTENTS

December 1984
Volume 55, Number 11

1985: The Year of the Gemstone
Appointment calendar featuring specimens from Field Museum's gemstone collection.

COVER

The Chalmers Topaz (5,890 carats) will be on view in the new Gem Hall. Photo by Ron Testa. 84618

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1985
The Year of the Gemstone

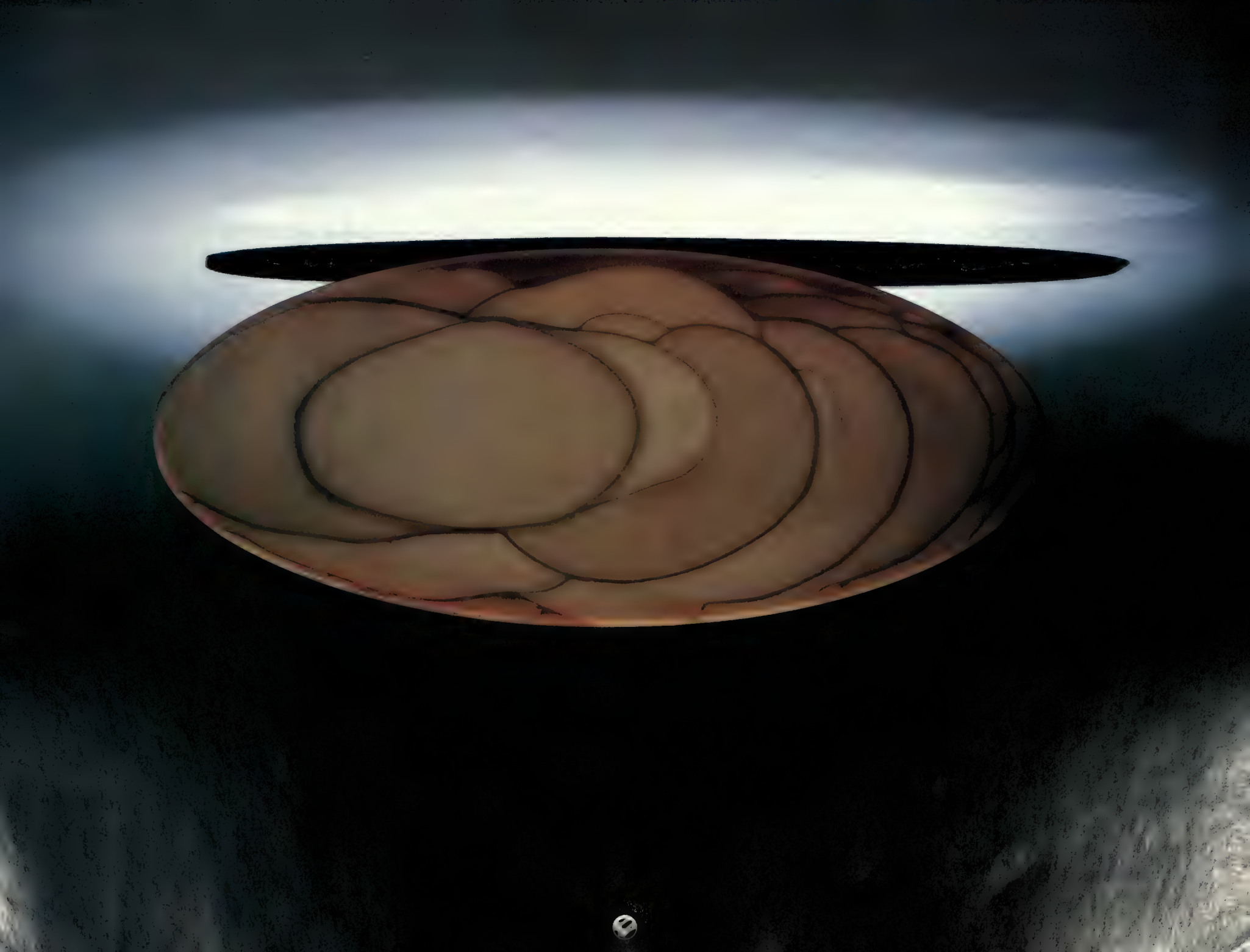
The Gem Hall is one of the most popular exhibits at the Field Museum. Sooner or later, virtually every adult who enters the Museum gravitates to the gems. Installed in its present location in 1921, the Gem Room has been renovated on two occasions. Since the last renovation there have been significant advances in lighting methods that bring out the full richness of color and internal "fire" in gemstones. Late in 1983 it was decided to completely redesign the gemstone exhibit in order to take advantage of these state-of-the-art exhibition techniques. The new design is a radical departure from the one it replaces. Lights, rich in the colors of the spectrum, are combined with attractive groupings; displays slowly rotated on turntables add movement and glitter to the room.

Traditionally, museums exhibit gems as things of beauty unto themselves. Little or no information is provided about them other than their names—it is thus in every major museum in the world. Yet, it has been our experience at Field Museum, based on decades of inquiries by the public, that people are eager for basic information about the gems they own, have inherited, or plan to buy. Departing from tradition, the new exhibit will add a fresh dimension to the viewing of gems. Each grouping of gemstones will have a modest amount of label copy describing those aspects that experience has shown us are of particular interest to the public. In addition, one section of the exhibit will be devoted to a general explanation of the gem-cutting art, display popular styles of cut stones, and provide a few basics about gem terms.

From ancient times to the present, certain gems have been regarded as endowed with magical or curative powers. One portion of the new exhibit will show examples of stones associated with such myths and superstitions.

The Field Museum calendar for 1985 offers on the following pages a brief sampling of gemstones to be seen in this newly designed exhibit.

—Edward Olsen, curator of mineralogy.



"Bruneau Canyon" agate (88 × 37 mm) from northwestern United States. 84654

January 1985

Field Museum of Natural History

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	Times for sunrise and sunset are for Chicago, Central Standard Time.	**1** **NEW YEAR'S DAY** Museum closed sunrise: 7:18am sunset: 4:31pm	**2** sunrise: 7:18am sunset: 4:31pm	**3** *Earth closest to Sun (perihelion) 91.4 million miles* sunrise: 7:18am sunset: 4:32pm	**4** sunrise: 7:18am sunset: 4:33pm	**5** sunrise: 7:18am sunset: 4:34pm
6 *full moon* sunrise: 7:18am sunset: 4:35pm	**7** sunrise: 7:18am sunset: 4:36pm	**8** sunrise: 7:18am sunset: 4:37pm	**9** sunrise: 7:17am sunset: 4:38pm	**10** sunrise: 7:17am sunset: 4:39pm	**11** sunrise: 7:17am sunset: 4:40pm	**12** sunrise: 7:17am sunset: 4:41pm
13 *last quarter* sunrise: 7:16am sunset: 4:43pm	**14** sunrise: 7:16am sunset: 4.44pm	**15** Martin Luther King's Birthday sunrise: 7:16am sunset: 4:45pm	**16** sunrise: 7:15am sunset: 4:46pm	**17** sunrise: 7:15am sunset: 4:47pm	**18** sunrise: 7:14am sunset: 4:48pm	**19** sunrise: 7:13am sunset: 4:50pm
20 *new moon* sunrise 7.13am sunset: 4:51pm	**21** sunrise: 7:12am sunset: 4.52pm	**22** sunrise: 7.12am sunset: 4:53pm	**23** sunrise: 7:11am sunset: 4:54pm	**24** sunrise: 7:10am sunset: 4:56pm	**25** sunrise: 7:09am sunset: 4:57pm	**26** sunrise: 7:09am sunset: 4:58pm
27 sunrise: 7:08am sunset: 4:59pm	**28** *first quarter* sunrise: 7:07am sunset: 5:01pm	**29** sunrise: 7:06am sunset: 5:02pm	**30** sunrise: 7:05am sunset: 5:03pm	**31** sunrise: 7:04am sunset: 5:04pm	**DECEMBER 1984** S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	**FEBRUARY** S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28

Peridots (153, 126, and 15 carats) from Zaberget Island in the Red Sea. 84781 Ron Testa

February 1985

Field Museum of Natural History

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				Times for sunrise and sunset are for Chicago, Central Standard Time.	**1** sunrise: 7:03am sunset: 5:06pm	**2** Groundhog Day sunrise: 7:02am sunset: 5:07pm
3 sunrise: 7:01am sunset: 5:08pm	**4** sunrise: 7:00am sunset: 5:10pm	**5** *full moon* sunrise: 6:59am sunset: 5:11pm	**6** sunrise: 6:58am sunset: 5:12pm	**7** sunrise: 6:57am sunset: 5:13pm	**8** sunrise: 6:55am sunset: 5:15pm	**9** sunrise: 6:54am sunset: 5:16pm
10 sunrise: 6:53am sunset: 5:17pm	**11** sunrise: 6:52am sunset: 5:19pm	**12** LINCOLN'S BIRTHDAY *last quarter* sunrise: 6:50am sunset: 5:20pm	**13** sunrise: 6:49am sunset: 5:21pm	**14** St. Valentine's Day sunrise: 6:48am sunset: 5:22pm	**15** sunrise: 6:47am sunset: 5:24pm	**16** sunrise: 6:45am sunset: 5:25pm
17 sunrise: 6:44am sunset: 5:26pm	**18** PRESIDENT'S DAY sunrise: 6:42am sunset: 5:27pm	**19** Shrove Tuesday *new moon* sunrise: 6:41am sunset: 5:29pm	**20** Ash Wednesday Chinese New Year sunrise: 6:40am sunset: 5:30pm	**21** sunrise: 6:38am sunset: 5:31pm	**22** sunrise: 6:37am sunset: 5:32pm	**23** sunrise: 6:35am sunset: 5:33pm
24 sunrise: 6:34am sunset: 5:35pm	**25** sunrise: 6:32am sunset: 5:36pm	**26** sunrise: 6:31am sunset: 5:37pm	**27** *first quarter* sunrise: 6:29am sunset: 5:38pm	**28** sunrise: 6:27am sunset: 5:39pm		

JANUARY

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

MARCH

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

Star sapphire from Sri Lanka (88 carats). 84671

Ron Testa

March 1985

Field Museum of Natural History

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
FEBRUARY S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28	**APRIL** S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30			Times for sunrise and sunset are for Chicago, Central Standard Time.	**1** sunrise: 6:26am sunset: 5:41pm	**2** sunrise: 6:24am sunset: 5:42pm
3 sunrise: 6:23am sunset: 5:43pm	**4** sunrise: 6:21am sunset: 5:44pm	**5** sunrise: 6:20am sunset: 5:45pm	**6** *full moon* sunrise: 6:18am sunset: 5:47pm	**7** Purim (begins sundown March 6) sunrise: 6:16am sunset: 5:48pm	**8** sunrise: 6:15am sunset: 5:49pm	**9** sunrise: 6:13am sunset: 5:50pm
10 sunrise 6 11am sunset. 5:51pm	**11** sunrise. 6 10am sunset: 5:52pm	**12** sunrise: 6:08am sunset: 5:53pm	**13** *last quarter* sunrise: 6:06am sunset: 5:55pm	**14** sunrise: 6:05am sunset: 5:56pm	**15** Ides of March sunrise: 6:03am sunset: 5:57pm	**16** sunrise: 6:01am sunset: 5:58pm
17 St. Patrick's Day sunrise: 6:00am sunset. 5.59pm	**18** sunrise: 5.58am sunset: 6.00pm	**19** sunrise: 5:56am sunset: 6:01pm	**20** *first day of spring* sunrise: 5:54am sunset: 6:02pm	**21** *new moon* sunrise: 5:53am sunset: 6:04pm	**22** sunrise: 5:51am sunset: 6:05pm	**23** sunrise: 5:49am sunset. 6:06pm
24 sunrise 5:48am sunset: 6:07pm Palm Sunday sunrise: 5:36am sunset: 6:15pm **31**	**25** sunrise: 5:46am sunset. 6.08pm	**26** sunrise: 5:44am sunset: 6:09pm	**27** sunrise: 5:43am sun 10pm	**28** sunrise: 5:41am sunset: 6:11pm	**29** *first quarter* sunrise: 5:39am sunset. 6 12pm	**30** sunrise. 5:37am sunset. 6:13pm

Bowl carved in Germany from South Dakota rose quartz crystal (diam. 26 cm). 84659

Diane Alexander White

April 1985

Field Museum of Natural History

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Times for sunrise and sunset are for Chicago, Central Standard Time. For Daylight Savings Time add 1 hour.	**1** sunrise: 5:34am sunset: 6:16pm	**2** sunrise: 5:32am sunset: 6:17pm	**3** sunrise: 5:31am sunset: 6:18pm	**4** sunrise: 5:29am sunset: 6:19pm	**5** Good Friday full moon sunrise: 5:27am sunset: 6:20pm	**6** **PASSOVER** (begins sundown April 5) sunrise: 5:26am sunset: 6:21pm
7 **EASTER** sunrise: 5:24am sunset: 6:22pm	**8** sunrise: 5:22am sunset: 6:23pm	**9** sunrise: 5:21am sunset: 6:24pm	**10** sunrise: 5:19am sunset: 6:25pm	**11** last quarter sunrise: 5:17am sunset: 6:27pm	**12** sunrise: 5:16am sunset: 6:28pm	**13** sunrise: 5:14am sunset: 6:29pm
14 sunrise: 5:13am sunset: 6:30pm	**15** sunrise: 5:11am sunset: 6:31pm	**16** sunrise: 5:09am sunset: 6:32pm	**17** sunrise: 5:08am sunset: 6:33pm	**18** sunrise: 5:06am sunset: 6:34pm	**19** new moon sunrise: 5:05am sunset: 6:35pm	**20** sunrise: 5:03am sunset: 6:36pm
21 sunrise: 5:02am sunset: 6:37pm	**22** sunrise: 5:00am sunset: 6:39pm	**23** sunrise: 4:59am sunset: 6:40pm	**24** sunrise: 4:57am sunset: 6:41pm	**25** sunrise: 4:56am sunset: 6:42pm	**26** sunrise: 4:54am sunset: 6:43pm	**27** first quarter sunrise: 4:53am sunset: 6:44pm
28 Daylight Savings Time begins 2:00am sunrise: 4:52am sunset: 6:45pm	**29** sunrise: 4:50am sunset: 6:46pm	**30** sunrise: 4:49am sunset: 6:47pm	**MARCH** S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	**MAY** S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31		

Color variation among gem tourmalines (58, 55, 27, and 21 carats). 84772

Ron Testa

May 1985

Field Museum of Natural History

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
APRIL S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	**JUNE** S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	Times for sunrise and sunset are for Chicago, Central Standard Time. For Daylight Savings Time add 1 hour.	**1** sunrise: 4:48am sunset: 6:48pm	**2** Field Museum opened 1921 (Grant Park) sunrise: 4:46am sunset: 6:49pm	**3** sunrise: 4:45am sunset: 6:51pm	**4** *full moon* sunrise: 4:44am sunset: 6:52pm
5 sunrise 4 42am sunset 6:53pm	**6** sunrise 4 41am sunset 6:54pm	**7** sunrise: 4:40am sunset: 6:55pm	**8** sunrise. 4:39am sunset: 6:56pm	**9** sunrise: 4:38am sunset: 6:57pm	**10** sunrise: 4:36am sunset: 6:58pm	**11** *last quarter* sunrise: 4:35am sunset. 6:59pm
12 Mother's Day sunrise 4 34am sunset 7 00pm	**13** sunrise 4 33am sunset 7 01pm	**14** sunrise: 4:32am sunset. 7.02pm	**15** sunrise: 4:31am sunset: 7.03pm	**16** Ascension (Whitsuntide) sunrise: 4:30am sunset: 7:04pm	**17** sunrise: 4:29am sunset: 7:05pm	**18** sunrise: 4:28am sunset: 7:06pm
19 *new moon* sunrise: 4 27am sunset: 7:07pm	**20** Ramadan (begins sunset May 20) sunrise 4.26am sunset 7.08pm	**21** sunrise: 4:26am sunset 7:09pm	**22** sunrise: 4.25am sunset: 7.10pm	**23** sunrise: 4:24am sunset: 7:11pm	**24** sunrise: 4:23am sunset. 7:12pm	**25** sunrise. 4:23am sunset: 7:13pm
26 Pentecost sunrise 4:22am sunset: 7 14pm	**27** **MEMORIAL DAY** *first quarter* sunrise 4 21am sunset 7 14pm	**28** sunrise: 4:21am sunset: 7 15pm	**29** sunrise: 4:20am su[illegible] 16pm	**30** sunrise: 4:19am sunset: 7:17pm	**31** sunrise: 4:19am sunset 7 18pm	

Chalmers Topaz (from Brazil) with three pale blue topazes (from the Soviet Union); 5,890, 290, 166, and 91 carats. 84783

Ron Testa

June 1985

Field Museum of Natural History

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
MAY S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	**JULY** S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31				Times for sunrise and sunset are for Chicago, Central Standard Time. For Daylight Savings Time add 1 hour.	**1** sunrise: 4:18am sunset: 7:18pm
2 Field Museum opened 1894 (Jackson Park) Trinity Sunday full moon sunrise: 4:18am sunset: 7:19pm	**3** sunrise: 4:18am sunset: 7:20pm	**4** sunrise: 4:17am sunset: 7:21pm	**5** sunrise: 4:17am sunset: 7:21pm	**6** sunrise: 4:17am sunset: 7:22pm	**7** sunrise: 4:16am sunset: 7:23pm	**8** sunrise: 4:16am sunset: 7:23pm
9 sunrise: 4:16am sunset: 7:24pm	**10** last quarter sunrise: 4:16am sunset: 7:24pm	**11** sunrise: 4:15am sunset: 7:25pm	**12** sunrise: 4:15am sunset: 7:25pm	**13** sunrise: 4:15am sunset: 7:26pm	**14** Flag Day sunrise: 4:16am sunset: 7:27pm	**15** sunrise: 4:15am sunset: 7:27pm
16 Father's Day sunrise: 4:15am sunset: 7:27pm	**17** sunrise: 4:15am sunset: 7:27pm	**18** new moon sunrise: 4:15am sunset: 7:28pm	**19** sunrise: 4:15am sunset: 7:28pm	**20** sunrise: 4:16am sunset: 7:28pm	**21** first day of summer sunrise: 4:16am sunset: 7:29pm	**22** sunrise: 4:16am sunset: 7:29pm
23 sunrise: 4:16am sunset: 7:29pm sunrise: 4:19am sunset: 7:29pm **30**	**24** sunrise: 4:17am sunset: 7:29pm	**25** first quarter sunrise: 4:17am sunset: 7:29pm	**26** sunrise: 4:17am sunset: 7:29pm	**27** sunrise: 4:18am sunset: 7:29pm	**28** sunrise: 4:18am sunset: 7:29pm	**29** sunrise: 4:18am sunset: 7:29pm

Black opal brooch (51 × 28 mm) with opalized vertebra of ancient reptile (165 g). 84658

Diane Alexander White

July 1985

Field Museum of Natural History

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Times for sunrise and sunset are for Chicago, Central Standard Time. For Daylight Savings Time add 1 hour.	**1** sunrise: 4:19am sunset: 7:29pm	**2** *full moon* sunrise: 4:20am sunset: 7:29pm	**3** sunrise: 4:20am sunset: 7:29pm	**4** INDEPENDENCE DAY sunrise: 4:21am sunset: 7:28pm	**5** *Earth furthest from Sun (aphelion) 94.5 million miles* sunrise: 4:22am sunset: 7:28pm	**6** sunrise: 4:22am sunset: 7:28pm
7 sunrise: 4:23am sunset: 7:27pm	**8** sunrise: 4:23am sunset: 7:27pm	**9** *last quarter* sunrise: 4:24am sunset: 7:27pm	**10** sunrise: 4:25am sunset: 7:26pm	**11** sunrise: 4:26am sunset: 7:26pm	**12** sunrise: 4:26am sunset: 7:25pm	**13** sunrise: 4:27am sunset: 7:25pm
14 sunrise: 4:28am sunset: 7:24pm	**15** sunrise: 4:29am sunset: 7:24pm	**16** sunrise: 4:29am sunset: 7:23pm	**17** *new moon* sunrise: 4:30am sunset: 7:22pm	**18** sunrise: 4:31am sunset: 7:22pm	**19** sunrise: 4:32am sunset: 7:21pm	**20** sunrise: 4:33am sunset: 7:20pm
21 sunrise: 4:34am sunset: 7:19pm	**22** sunrise: 4:35am sunset: 7:19pm	**23** sunrise: 4:36am sunset: 7:18pm	**24** *first quarter* sunrise: 4:37am sunset: 7:17pm	**25** sunrise: 4:37am sunset: 7:16pm	**26** sunrise: 4:38am sunset: 7:15pm	**27** sunrise: 4:39am sunset: 7:14pm
28 sunrise: 4:40am sunset: 7:13pm	**29** sunrise: 4:41am sunset: 7:12pm	**30** sunrise: 4:42am sunset: 7:11pm	**31** *full moon* sunrise: 4:43am s 7:10pm	**JUNE** S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	**AUGUST** S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	

August 1985

Field Museum of Natural History

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
JULY S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	**SEPTEMBER** S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30		Times for sunrise and sunset are for Chicago, Central Standard Time. For Daylight Savings Time add 1 hour.	**1** sunrise: 4:44am sunset: 7:09pm	**2** sunrise: 4:45am sunset: 7:08pm	**3** sunrise: 4:46am sunset: 7:06pm
4 sunrise: 4:47am sunset. 7:05pm	**5** sunrise: 4:48am sunset: 7:04pm	**6** sunrise: 4:49am sunset: 7:03pm	**7** sunrise: 4:50am sunset: 7:02pm	**8** *last quarter* sunrise: 4:51am sunset: 7:00pm	**9** sunrise: 4:52am sunset: 6:59pm	**10** sunrise: 4:53am sunset: 6:58pm
11 sunrise: 4:54am sunset 6.56pm	**12** sunrise: 4:55am sunset: 6.55pm	**13** sunrise: 4:56am sunset. 6:54pm	**14** sunrise: 4:57am sunset: 6:52pm	**15** sunrise. 4:58am sunset: 6:51pm	**16** *new moon* sunrise: 4:59am sunset. 6.49pm	**17** sunrise: 5:01am sunset: 6:48pm
18 sunrise: 5:02am sunset: 6:46pm	**19** sunrise: 5:03am sunset: 6.45pm	**20** sunrise: 5:04am sunset: 6:43pm	**21** sunrise: 5:05am sunset: 6:42pm	**22** *first quarter* sunrise: 5:06am sunset: 6:40pm	**23** sunrise: 5:07am sunset: 6:39pm	**24** sunrise: 5.08am sunset: 6:37pm
25 sunrise 5:09am sunset: 6:36pm	**26** sunrise: 5:10am sunset: 6:34pm	**27** sunrise: 5:11am sunset: 6:33pm	**28** sunrise: 5:12am sunset: 6:31pm	**29** sunrise: 5:13am sunset: 6:29pm	**30** *full moon* sunrise: 5:14am sunset 6:28pm	**31** sunrise: 5:15am sunset: 6:26pm

Light smoky quartz from Colorado (1,822 carats). G32T

John Bayalis

September 1985

Field Museum of Natural History

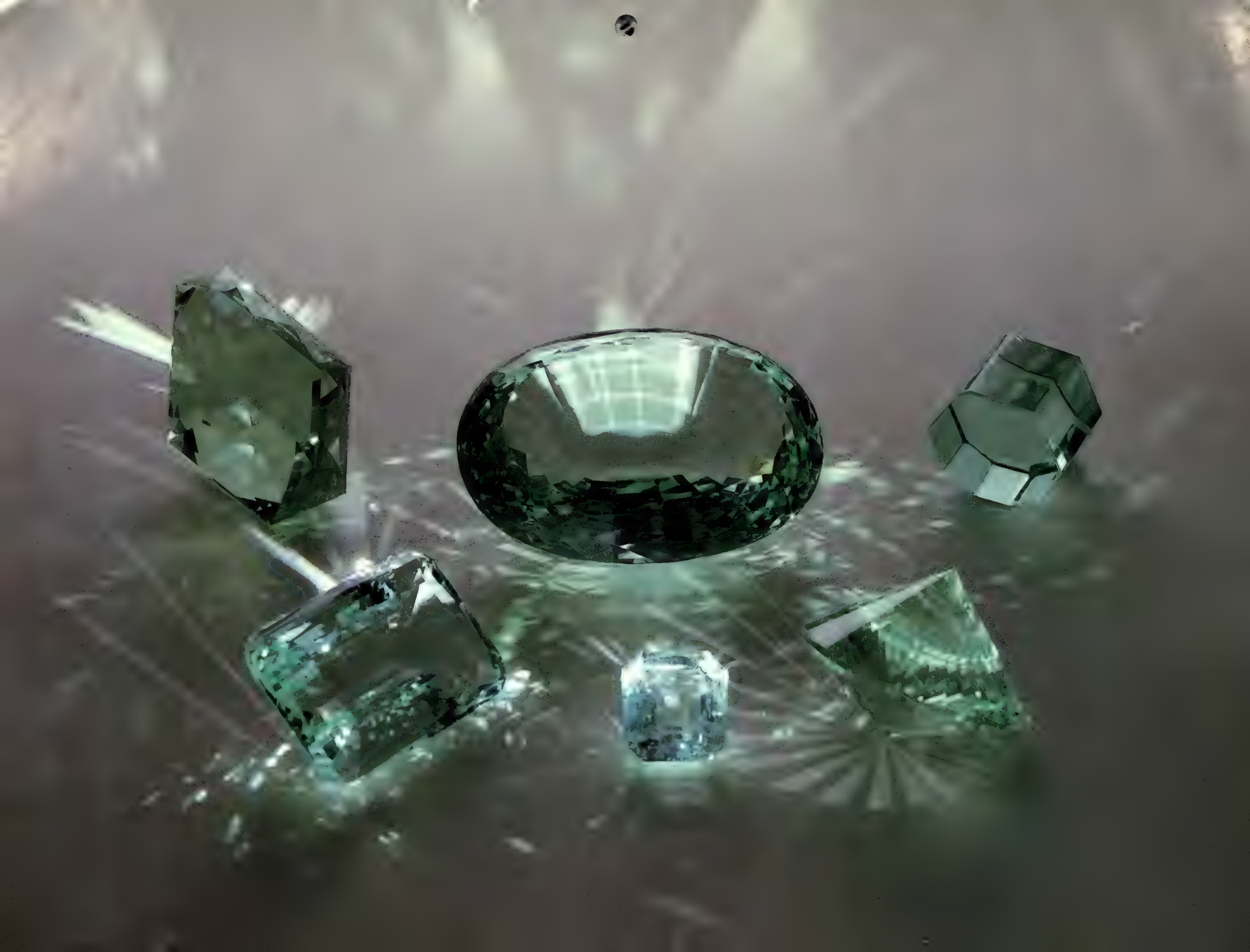
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1 Times for sunrise and sunset are for Chicago, Central Standard Time. For Daylight Savings Time add 1 hour. sunrise: 5:16am sunset: 6:24pm	**2** LABOR DAY sunrise: 5:17am sunset: 6:23pm	**3** sunrise: 5:18am sunset: 6:21pm	**4** sunrise: 5:19am sunset: 6:19pm	**5** sunrise: 5:20am sunset: 6:18pm	**6** sunrise: 5:21am sunset: 6:16pm	**7** last quarter sunrise: 5:22am sunset: 6:14pm
8 sunrise: 5:23am sunset: 6:13pm	**9** sunrise: 5:24am sunset: 6:11pm	**10** sunrise: 5:25am sunset: 6:09pm	**11** sunrise: 5:26am sunset: 6:07pm	**12** sunrise: 5:27am sunset: 6:06pm	**13** sunrise: 5:28am sunset: 6:04pm	**14** new moon sunrise: 5:29am sunset: 6:02pm
15 sunrise: 5:30am sunset: 6:00pm	**16** ROSH HASHANA (begins sundown Sept 15) Islamic New Year (begins sunset Sept 15) Field Museum founded 1893 sunrise: 5:31am sunset: 5:59pm	**17** sunrise: 5:32am sunset: 5:57pm	**18** sunrise: 5:33am sunset: 5:55pm	**19** sunrise: 5:34am sunset: 5:54pm	**20** sunrise: 5:35am sunset: 5:52pm	**21** first quarter sunrise: 5:36am sunset: 5:50pm
22 first day of fall sunrise: 5:38am sunset: 5:48pm	**23** sunrise: 5:39am sunset: 5:47pm	**24** sunrise: 5:40am sunset: 5:45pm	**25** YOM KIPPUR sunrise: 5:41am sunset: 5:43pm	**26** sunrise: 5:42am sunset: 5:41pm	**27** American Indian Day sunrise: 5:43am sunset: 5:40pm	**28** full moon sunrise: 5:44am sunset: 5:38pm
29 sunrise: 5:45am sunset: 5:36pm	**30** sunrise: 5:46am sunset: 5:35pm					

AUGUST

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

OCTOBER

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		



Gem beryls (339, 170, 117, 114, 88, and 16 carats). 84775

Diane Alexander-White

October 1985

Field Museum of Natural History

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	Times for sunrise and sunset are for Chicago, Central Standard Time. For Daylight Savings Time add 1 hour.	**1** sunrise: 5:47am sunset: 5:33pm	**2** sunrise: 5:48am sunset: 5:31pm	**3** sunrise: 5:49am sunset: 5:29pm	**4** sunrise: 5:50am sunset: 5:28pm	**5** sunrise: 5:51am sunset: 5:26pm
6 *last quarter* sunrise: 5:52am sunset: 5:24pm	**7** sunrise: 5:53am sunset: 5:23pm	**8** sunrise: 5:55am sunset: 5:21pm	**9** sunrise: 5:56am sunset: 5:19pm	**10** sunrise: 5:57am sunset: 5:18pm	**11** sunrise: 5:58am sunset: 5:16pm	**12** sunrise: 5:59am sunset: 5:15pm
13 *new moon* sunrise: 6:00am sunset: 5:13pm	**14** Columbus Day sunrise: 6:01am sunset: 5:11pm	**15** sunrise: 6:02am sunset: 5:10pm	**16** sunrise: 6:03am sunset: 5:08pm	**17** sunrise: 6:05am sunset: 5:07pm	**18** sunrise: 6:06am sunset: 5:05pm	**19** sunrise: 6:07am sunset: 5:04pm
20 *first quarter* sunrise: 6:08am sunset: 5:02pm	**21** sunrise: 6:09am sunset: 5:01pm	**22** sunrise: 6:10am sunset: 4:59pm	**23** sunrise: 6:12am sunset: 4:58pm	**24** United Nations Day sunrise: 6:13am sunset: 4:56pm	**25** sunrise: 6:14am sunset: 4:55pm	**26** sunrise: 6:15am sunset: 4:53pm
27 Daylight Savings Time ends 2:00am sunrise: 6:16am sunset: 4:52pm	**28** *full moon* sunrise: 6:17am sunset: 4:51pm	**29** sunrise: 6:19am sunset: 4:49pm	**30** sunrise: 6:20am sunset: 4:48pm	**31** Halloween sunrise: 6:21am sunset: 4:47pm		

SEPTEMBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

NOVEMBER

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

Aquariums (342 and 179 cards). 84/1

Ron Testa

November 1985

Field Museum of Natural History

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
OCTOBER S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	**DECEMBER** S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31			Times for sunrise and sunset are for Chicago, Central Standard Time.	**1** sunrise: 6:22am sunset: 4:45pm	**2** sunrise: 6:24am sunset: 4:44pm
3 sunrise: 6:25am sunset: 4:43pm	**4** sunrise: 6:26am sunset: 4:42pm	**5** General Election Day *last quarter* sunrise: 6:27am sunset: 4:41pm	**6** sunrise: 6:28am sunset: 4:39pm	**7** sunrise: 6:30am sunset: 4:38pm	**8** sunrise: 6:31am sunset: 4:37pm	**9** sunrise: 6:32am sunset: 4:36pm
10 sunrise: 6:33am sunset: 4:35pm	**11** Veteran's Day sunrise: 6:35am sunset: 4:34pm	**12** *new moon* sunrise: 6:36am sunset: 4:33pm	**13** sunrise: 6:37am sunset: 4:32pm	**14** sunrise: 6:38am sunset: 4:31pm	**15** sunrise: 6:39am sunset: 4:30pm	**16** sunrise: 6:41am sunset: 4:30pm
17 sunrise: 6:42am sunset: 4:29pm	**18** sunrise: 6:43am sunset: 4:28pm	**19** *first quarter* sunrise: 6:44am sunset: 4:27pm	**20** sunrise: 6:45am sunset: 4:27pm	**21** sunrise: 6:47am sunset: 4:26pm	**22** sunrise: 6:48am sunset: 4:25pm	**23** sunrise: 6:49am sunset: 4:25pm
24 sunrise: 6:50am sunset: 4:24pm	**25** sunrise: 6:51am sunset: 4:23pm	**26** sunrise: 6:52am sunset: 4:23pm	**27** *full moon* sunrise: 6:54am su[illegible]22pm	**28** **THANKSGIVING** (Museum closed) sunrise: 6:55am sunset: 4:22pm	**29** sunrise: 6:56am sunset: 4:22pm	**30** sunrise: 6:57am sunset: 4:21pm

Brazil kunzites (506, 294, and 63 carats). 84779

Ron Testa

December 1985

Field Museum of Natural History

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1 Advent Times for sunrise and sunset are for Chicago, Central Standard Time. sunrise: 6:58am sunset: 4:21pm	**2** sunrise: 6:59am sunset: 4:21pm	**3** sunrise: 7:00am sunset: 4:20pm	**4** sunrise: 7:01am sunset: 4:20pm	**5** last quarter sunrise: 7:02am sunset: 4:20pm	**6** sunrise: 7:03am sunset: 4:20pm	**7** sunrise: 7:04am sunset: 4:20pm
8 **HANUKKAH** (begins sundown Dec 7) sunrise: 7:05am sunset: 4:20pm	**9** sunrise: 7:06am sunset: 4:20pm	**10** sunrise: 7:07am sunset: 4:20pm	**11** new moon sunrise: 7:07am sunset: 4:20pm	**12** sunrise: 7:08am sunset: 4:20pm	**13** sunrise: 7:09am sunset: 4:20pm	**14** sunrise: 7:10am sunset: 4:21pm
15 sunrise: 7:11am sunset: 4:21pm	**16** sunrise: 7:11am sunset: 4:21pm	**17** sunrise: 7:12am sunset: 4:21pm	**18** first quarter sunrise: 7:13am sunset: 4:22pm	**19** sunrise: 7:13am sunset: 4:22pm	**20** sunrise: 7:14am sunset: 4:23pm	**21** *first day of winter* sunrise: 7:14am sunset: 4:23pm
22 sunrise: 7:15am sunset: 4:24pm	**23** sunrise: 7:15am sunset: 4:24pm	**24** sunrise: 7:16am sunset: 4:25pm	**25** **CHRISTMAS** (Museum closed) sunrise: 7:16am sunset: 4:25pm	**26** sunrise: 7:16am sunset: 4:26pm	**27** full moon sunrise: 7:17am sunset: 4:27pm	**28** sunrise: 7:17am sunset: 4:27pm
29 sunrise: 7:17am sunset: 4:28pm	**30** sunrise: 7:17am sunset: 4:29pm	**31** sunrise: 7:18am sunset: 4:30pm				

NOVEMBER

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

JANUARY 1986

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

Roosevelt Road at Lake Shore Drive
Chicago, IL 60605

001F288
Edith Fleming
946 Pleasant
Oak Pk , IL 60302